

EXHIBIT 3

In the Matter Of:

Oklahoma Farm Bureau Mutual Ins Co As Subrogee of Michael Diel vs

OMEGA Flex

ELIZABETH BUC, PH.D.

May 11, 2023



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21	Christine E. Borrelli, CSR, RPR, RMR	23	Exhibits digitally marked and returned to counsel with
22	LEXITAS LEGAL	24	transcript.
23	(508) 478-9795 - (508) 478-0595 (Fax)	25	
24	www.LexitasLegal.com		
25			
2	**Counsel, witness, and court reporter appearing remotely** APPEARANCES: ATTORNEYS FOR THE PLAINTIFF: CATHCART & DOOLEY 2807 Classen Boulevard Oklahoma City, OK 73106 (405) 524-1110 BY: W.R. CATHCART, ESQ. bcathcart@cathcartdooley.com ATTORNEYS FOR THE DEFENDANT OMEGA FLEX, INC.: GORDON & REES, LLP 95 Glastonbury Boulevard - Suite 206 Glastonbury, CT 06033 (860) 494-7542 BY: CULLEN GUILMARTIN, ESQ. cguilmartin@grsm.com In Attendance: Josh Clarke, Lexitas videographer Todd DeSmet, Oklahoma Farm Bureau	4	VIDEOGRAPHER: We are on the record on May 11, 2023, at approximately 9:01 Central Time for the remote video deposition of Elizabeth Buc in the matter of Oklahoma Fire Bureau Mutual Insurance Company as Subrogee of Michael Diel versus Omega Flex, Inc. My name is Joshua Clarke, and I am the videographer on behalf of Lexitas. All appearances will be noted on the stenographic record. Will the court reporter please now swear in the witness. ELIZABETH C. BUC, Ph.D., PE, CFI, having first been identified by the production of a driver's license, was duly sworn and testifies as follows: DIRECT EXAMINATION BY MR. GUILMARTIN: Q. Good morning, Dr. Buc. It's Cullen Guilmartin. We have met a few times now. I represent Omega Flex, and I'm going to have some questions for you regarding the Diel loss. Okay? A. Sure. Good morning, Cullen. Q. Good morning. Can you please state your full name for the record? A. My name is Elizabeth Carrie Buc, B-U-C. Q. And where are you currently taking this deposition from?

<p style="text-align: right;">5</p> <p>1 A. I am currently sitting in my office at Fire and 2 Materials Research Laboratory, LLC, 33025 Industrial Road in 3 Livonia, L-I-V-O-N-I-A, Michigan. 4 Q. And so you are at the place of your employment; is 5 that correct? 6 A. That's correct. I'm in my office, yes. 7 Q. And did you bring any documents with you today that 8 you have access to? 9 A. Yeah. So I have a paper copy of my deposition 10 notice, my reports, my handwritten notes, and then I have a 11 laptop computer to my left that is open to the Dropbox file 12 that contains all of the file materials requested as part of 13 the deposition notice. 14 Q. Got it. And the notes, are those your notes from 15 the lab exam? 16 A. Yes. 17 Q. Okay. Are there any other notes, other than your 18 notes from the lab exam? 19 A. No. 20 Q. Okay. I am going to mark your deposition notice as 21 Exhibit 1. Dr. Buc, you mentioned that you have the 22 deposition notice with you today. What I have marked or will 23 have marked as Exhibit 1 is the notice of your deposition. At 24 page 3 of that deposition notice, there are some requests for 25 production, and you indicated that you have your Dropbox file</p>	<p style="text-align: right;">7</p> <p>1 Integrity, nor do I believe I saw Integrity's file, but it's 2 your testimony that they provided you with certain materials 3 related to the Diel loss? 4 A. So the certain materials related to the Diel loss 5 that are included in the Dropbox file I produced do include 6 Integrity's lab data that I attended, the sign-in sheets, and 7 Integrity's field notes and photographs. 8 Q. Okay. And what about the scene -- oh, so you do 9 have the scene photographs from Integrity? 10 A. Yes, and they were requested as part of my 11 production of documents. They specifically asked for, I 12 believe, items from Integrity -- 13 Q. Okay. 14 A. -- and so I did upload, and I included a folder 15 called "Integrity notes and photographs." 16 Q. Okay. And what about Mr. Ozment, have you 17 corresponded with him in any way regarding this loss? 18 A. There may have been one conference call, and he may 19 have been in attendance at the lab exam. 20 Q. Okay. That conference call, was counsel on that 21 call? 22 A. I don't remember. It's -- most likely, but I don't 23 remember specifically. 24 Q. And do you recall when that occurred? 25 A. I am looking at my invoice to determine if I can</p>
<p style="text-align: right;">6</p> <p>1 with you and that contains your file in this case; is that 2 right? 3 A. To the best of my ability, yes, that's correct. 4 Q. And that Dropbox link -- well, strike that. In the 5 request for production, essentially, they ask for your file 6 related to the Diel loss; is that right? 7 A. Yes. 8 Q. Okay. And the Dropbox link contains your file? 9 A. Correct. 10 Q. Okay. 11 A. Yes. 12 Q. Have you had any emails with, for example, the folks 13 at Integrity regarding this case? 14 A. Maybe a handful of emails, but -- yeah, a handful, 15 probably, with respect to scheduling. 16 Q. Okay. 17 A. And then Integrity did share with me their scene 18 notes and photographs in advance of the lab exam, and so there 19 is going to be correspondence with respect to sharing that 20 Dropbox file with me. 21 Q. Understood. 22 A. They also shared the sign-in sheet from the lab exam 23 electronically, so that would be in an email form as well, but 24 I do have that as part of my file. 25 Q. Okay. So I'm not sure that I saw emails with</p>	<p style="text-align: right;">8</p> <p>1 share a date with you. There was one conference call on 2 January 26, 2023, and that was after the lab exam. 3 Q. And do you specifically recall Mr. Ozment being on 4 that call? 5 A. I would say it would be typical, but I don't have an 6 independent recollection, but I would consider that typical. 7 Q. If Mr. Ozment testified that he didn't have any 8 correspondence or communications with you, would you have any 9 reason to disagree with his testimony? 10 A. No. 11 MR. CATHCART: Objection to the form. 12 THE WITNESS: Sorry, no. 13 Q. (By Mr. Guilmartin) Have you worked with Mr. Ozment 14 on other fire losses? 15 A. His name is not familiar to me. It's possible, but 16 I would say not likely. This is probably the first case that 17 I worked with Mr. Ozment. 18 Q. Do you have a specific recollection of any 19 communications that you had with Mr. Ozment regarding his 20 opinions? 21 A. Not specifically, no. 22 Q. Did you receive a copy of Mr. Ozment's report? 23 A. I'm sure I did, yes. 24 Q. Do you know if your report was shared with 25 Mr. Ozment?</p>

<p style="text-align: right;">9</p> <p>1 A. I'd have to defer to Mr. Cathcart for that.</p> <p>2 Q. Would you agree with me that if Mr. Ozment had never</p> <p>3 seen your report and had never communicated with you, that he</p> <p>4 couldn't have relied on your opinions in his report?</p> <p>5 MR. CATHCART: Object to the form.</p> <p>6 THE WITNESS: Again, I don't know what was provided</p> <p>7 to him or not provided to him.</p> <p>8 Q. (By Mr. Guilmartin) In preparation for today, did</p> <p>9 you review the deposition transcripts of either Kelly Colwell</p> <p>10 or Mark Hergenrether?</p> <p>11 A. No.</p> <p>12 Q. Have you seen those transcripts?</p> <p>13 A. No.</p> <p>14 Q. Since Kelly and Mark were deposed a couple of weeks</p> <p>15 ago, so within the last two weeks, have you had any</p> <p>16 correspondence or calls with them?</p> <p>17 A. No, not that I recall.</p> <p>18 Q. In preparation for today, did you review the report,</p> <p>19 the Integrity report?</p> <p>20 A. I have not.</p> <p>21 Q. And did you review the Ozment report?</p> <p>22 A. I have it, but I have not.</p> <p>23 Q. What specifically did you do to prepare for today?</p> <p>24 A. So I reviewed my notes and photographs, the</p> <p>25 Integrity lab exam data, the RTI ICP results, my notes from</p>	<p style="text-align: right;">11</p> <p>1 CSST by EDS, which is energy dispersive spectroscopy. And</p> <p>2 similarly, we looked at the composition of the coax shield by</p> <p>3 EDS, and it turned out to be aluminum.</p> <p>4 Q. And I know that the ICP, that was done by RTI. And</p> <p>5 then the EDS, did you do that at the lab during the lab exam?</p> <p>6 A. Yes. The EDS was conducted by Michael Shuttlesworth</p> <p>7 at Integrity while I was present. He did perform some</p> <p>8 additional analyses under my direction, which are called dot</p> <p>9 mapping, and that data is contained in the Integrity lab exam</p> <p>10 data file as well.</p> <p>11 Q. And that data is in your file; is that right?</p> <p>12 A. It is in my file, and it is in the Dropbox file,</p> <p>13 that's correct.</p> <p>14 Q. So the universe of the chemical tests that were</p> <p>15 performed at the lab exam are the ICP test on the CSST and</p> <p>16 then the EDS examination of some of the other artifacts,</p> <p>17 including the coax cable; is that right?</p> <p>18 A. Just for clarification, the sample for CSST -- or</p> <p>19 the sample for ICP was collected during the lab exam and</p> <p>20 submitted afterwards. And the data was shared, but a</p> <p>21 majority, if not all, of the EDS that was done on the CSST and</p> <p>22 the coax cable shield was performed at Integrity during the</p> <p>23 lab exam.</p> <p>24 Q. And who decided to perform the ICP analysis?</p> <p>25 A. We -- I would say I have been collecting ICP samples</p>
<p style="text-align: right;">10</p> <p>1 the depositions of Mr. and Mrs. Diel, and Exponent's report in</p> <p>2 this matter, as well as some literature.</p> <p>3 Q. And the ICP results that you refer to, what</p> <p>4 artifacts from the fire loss did the ICP results relate to?</p> <p>5 A. So it is typical, and we did in this case take a</p> <p>6 small section of the subject corrugated stainless steel tubing</p> <p>7 and submitted it for detailed chemistry by inductively coupled</p> <p>8 plasma spectroscopy, which was performed by RTI Laboratories.</p> <p>9 And the results of ICP show minor amounts of copper present in</p> <p>10 the base metal chemistries of the CSST, as well as small</p> <p>11 amounts of aluminum and zinc.</p> <p>12 Q. And so the two tests, the ICP tests, relate to the</p> <p>13 CSST; is that right?</p> <p>14 A. So there was a single sample submitted for analysis,</p> <p>15 and yes, that's the ICP.</p> <p>16 Q. And so there was no ICP test performed on, for</p> <p>17 example, the electrical conductors that were retained; is that</p> <p>18 right?</p> <p>19 A. The electrical conductors were examined in the</p> <p>20 laboratory, but we did not perform chemical analysis on those</p> <p>21 conductors, but for we did look at the chemical composition of</p> <p>22 the field of one of the coax cables, which turned out to be</p> <p>23 aluminum.</p> <p>24 Q. And how did you do that?</p> <p>25 A. We did do other chemical analyses of the subject</p>	<p style="text-align: right;">12</p> <p>1 from various CSST manufacturers over time for the purpose of</p> <p>2 determining what the base metal chemistry of the 304 stainless</p> <p>3 steel is, and specifically with respect to the presence and</p> <p>4 concentration of copper, aluminum, and zinc.</p> <p>5 Q. And in the ICP test, one of the tests was on the</p> <p>6 base metal, the CSST, and the other was on the splatter around</p> <p>7 the hole; is that right?</p> <p>8 A. For clarification, did you say ICP or EDS?</p> <p>9 Q. ICP.</p> <p>10 A. No. So ICP is only performed on what we would call</p> <p>11 a comparison sample of the same run of half-inch TracPipe but</p> <p>12 removed from any fire damage and the location of the</p> <p>13 perforation.</p> <p>14 Q. Understood. Were you asked -- are you aware of the</p> <p>15 NTS report that Integrity performed? They did some testing at</p> <p>16 the Lightning Testing Institute. Are you aware of that</p> <p>17 testing that Integrity ran?</p> <p>18 A. So I'm aware of a lot of testing that Integrity has</p> <p>19 executed over time, not only in their own high-voltage</p> <p>20 laboratory, but at the lightning test facility. I can't say</p> <p>21 that I have, you know, committed to memory all of the results</p> <p>22 or the reports from that work, but I am certainly aware that</p> <p>23 they have performed a lot of testing, yes.</p> <p>24 Q. And were you asked to perform an ICP analysis of any</p> <p>25 of the CSST that was subject to the tests that were performed</p>

<p style="text-align: right;">13</p> <p>1 by Integrity at NTS?</p> <p>2 A. Not specifically, no. However, I have a database of</p> <p>3 ICP results from various CSST over time.</p> <p>4 Q. Yeah, no, so I'm more concerned about their testing</p> <p>5 where the opposing electrode was an electrical conductor, and</p> <p>6 they put the electrical conductor in contact with the CSST. I</p> <p>7 mean, they did that at NTS. They also did it with the coffee</p> <p>8 and the espresso test. And I'm wondering if you did any ICP</p> <p>9 work related to those tests?</p> <p>10 A. So, to be clear, ICP is done to determine the</p> <p>11 composition of the base metal chemistry of the 304 stainless</p> <p>12 steel. And then EDS is typically used to characterize the</p> <p>13 composition around any melt opening during any lab exam or</p> <p>14 after any test. With respect to your specific question, I</p> <p>15 don't know if EDS was done after that particular series of</p> <p>16 tests. If it was, I haven't reviewed the data, but I'm aware</p> <p>17 of other data, not only from my experience, but published by</p> <p>18 others that performed EDS after either testing when in contact</p> <p>19 with energized electrical conductors or otherwise.</p> <p>20 Q. Got it. And thank you for that clarification for</p> <p>21 me. So if I have it correct, you have not performed EDS work</p> <p>22 related to the NTS testing or the coffee or espresso testing</p> <p>23 performed by Integrity?</p> <p>24 A. So, again, if that work has been performed, I have</p> <p>25 not reviewed it. So it's possible that has been done.</p>	<p style="text-align: right;">15</p> <p>1 involving CSST for Farm Bureau?</p> <p>2 A. No, not that comes to mind.</p> <p>3 Q. Are you currently working on any cases involving</p> <p>4 Omega Flex's CounterStrike product?</p> <p>5 A. Yes. I have a few open files that involve Omega</p> <p>6 Flex CounterStrike products.</p> <p>7 Q. And what about a product sold under the trade name</p> <p>8 FlashShield. Are you working on any matters involving</p> <p>9 FlashShield?</p> <p>10 A. I have had experience with FlashShield CSST, but</p> <p>11 my -- I don't believe any of my current files or any recent</p> <p>12 files involve FlashShield CSST.</p> <p>13 Q. Are you currently working on any matters involving</p> <p>14 fires that originated at radiant barriers?</p> <p>15 A. Not at this time.</p> <p>16 Q. Have you worked on matters previously where fires or</p> <p>17 radiant barriers were involved in a fire?</p> <p>18 A. So I'm aware of the product. I have reviewed</p> <p>19 testing performed by Integrity. I have personally examined</p> <p>20 radiant barrier artifacts from various fire scenes, and I have</p> <p>21 even co-authored a presentation on radiant barriers with</p> <p>22 Mr. Geer from Integrity.</p> <p>23 Q. And will you agree with me that the testing that is</p> <p>24 performed that is at issue in your co-authored paper, that</p> <p>25 electrical arcing from the radiant barrier resulted in</p>
<p style="text-align: right;">14</p> <p>1 Secondly, with respect to coffee or espresso, I do have in my</p> <p>2 possession a laboratory-created opening between CSST and an</p> <p>3 energized conductor from Integrity that has the number R009.</p> <p>4 So I have chemically analyzed that by EDS. I just don't know</p> <p>5 if R009 from Integrity corresponds to any coffee or espresso</p> <p>6 or other test, but it was definitely a laboratory-created</p> <p>7 opening between an energized conductor exposed to fire and</p> <p>8 intimate contact with CSST.</p> <p>9 Q. When were you first retained to work on this case?</p> <p>10 A. I believe I was first contacted in late December,</p> <p>11 2022.</p> <p>12 Q. And who reached out to get you involved in the case?</p> <p>13 A. Typically, Mr. Colwell will refer me to the client,</p> <p>14 which in this case is Farm Bureau of Oklahoma. And then Farm</p> <p>15 Bureau of Oklahoma then retains my services as an engineer and</p> <p>16 a metallurgist to examine and characterize the damage to CSST</p> <p>17 from a fire scene.</p> <p>18 Q. Would you agree with me that you were not at the</p> <p>19 site inspecting in that matter?</p> <p>20 A. In this particular matter, that is correct, but I</p> <p>21 did review all of the photographs from both Mark Herberger</p> <p>22 (sic) --</p> <p>23 Q. Hergenrether.</p> <p>24 A. -- Hergenrether, as well as Mr. Colwell.</p> <p>25 Q. Are you currently working on any other matters</p>	<p style="text-align: right;">16</p> <p>1 ignition in the testing that you performed, and that is at</p> <p>2 issue in your paper?</p> <p>3 A. I would have to recall or -- I'm sorry, I'd have to</p> <p>4 reread that presentation for the specifics, but I do recall</p> <p>5 that not all forms and installations of radiant barrier are</p> <p>6 subject to the same response under lightning strike events.</p> <p>7 But, again, I would have to review that presentation</p> <p>8 specifically, but my recollection is the radiant barrier</p> <p>9 installed at the Diel home did not have the same</p> <p>10 characteristics in terms of installation with H clips that was</p> <p>11 the subject of the paper presented at ISFI with Mr. Geer.</p> <p>12 Q. Would you agree with me that there was radiant</p> <p>13 barrier that was consumed within the area of origin at the</p> <p>14 Diel home?</p> <p>15 A. Yes. In general, yes.</p> <p>16 Q. And do you have any knowledge as to how the radiant</p> <p>17 barrier was affixed to the side of the roof?</p> <p>18 A. So my recollection is that it's a thin foil</p> <p>19 composite over an insulation and, without referring to</p> <p>20 photographs, I thought it was staples as opposed to H clips.</p> <p>21 Q. And so the staples would have held this foil barrier</p> <p>22 to the side of the Diel attic; is that right?</p> <p>23 A. That's my recollection without looking at specific</p> <p>24 photographs of the same radiant barrier that was not consumed</p> <p>25 by fire elsewhere in the Diel attic.</p>

<p style="text-align: right;">17</p> <p>1 Q. Would you agree with me that foil radiant barrier 2 would be conductive?</p> <p>3 A. Well, aluminum foil under some conditions and in 4 some forms can be conductive, yes.</p> <p>5 Q. I don't see anything within your report where you 6 rule out radiant barrier -- the radiant barrier as a cause of 7 this fire. Was that outside the scope of your attention?</p> <p>8 A. So, again, in this, as well as in other CSST cases 9 as a metallurgist, I am principally retained to examine the 10 damage to the corrugated stainless steel material and to, 11 essentially, interpret and opine on the root cause of that 12 damage. I do look at the area in which the CSST is installed. 13 But with respect to other potential ignition scenarios, I 14 leave that to the fire investigator and/or Integrity.</p> <p>15 Q. And so then would you agree with me that you are not 16 offering an origin and cause opinion consistent with NFPA 921 17 because you're not ruling out the other potential causes of 18 this fire?</p> <p>19 A. Well, I'm a certified fire investigator from the 20 International Association of Arson Investigations, and I 21 utilize my fire investigation training and experience in, 22 essentially, reviewing the work that the fire investigators 23 processing the scene and processing the evidence, you know, 24 occurs to industry standards. But with respect to the CSST in 25 this and other cases, I am principally retained as a</p>	<p style="text-align: right;">19</p> <p>1 role, nor am I trying to take over the position of Fire 2 Investigator Ozment.</p> <p>3 Q. Okay. But under N921, in order to render an origin 4 and cause opinion, you have to rule out all potential 5 hypotheses for the first fuel ignited. And here would you 6 agree with me that you have not performed that analysis 7 because, for example, you don't discuss the radiant barrier in 8 your report?</p> <p>9 A. Well, I disagree in part because I do consider other 10 factors, especially with respect to where the opening in the 11 CSST is located, and other data, including the timeline, the 12 STRIKE net report and, you know, the presence of radiant 13 barrier, just like the presence of electrical conductors and 14 other artifacts in the area of the opening. So, again, my 15 answer is not no. But as a certified fire investigator, I do, 16 you know, consider that additional data in the examination 17 that I perform and the opinions that I render.</p> <p>18 Q. I'm going to open your report. At some point, I'm 19 going to have the premarked exhibits -- and just for the 20 record what I had done, and what I hope to upload is -- and we 21 can do the -- deal with this after a break, but I'll mark your 22 CV as Exhibit 2, your prior testimony marked as Exhibit 3. 23 Your rate sheet marked as Exhibit 4, and then your -- the 24 report itself marked as Exhibit 5, but I will get to those 25 hopefully soon, but I have the report, your Rule 26 disclosure</p>
<p style="text-align: right;">18</p> <p>1 metallurgist to examine, opine, and characterize the root 2 cause of that damage.</p> <p>3 Q. Right.</p> <p>4 A. But I do look -- but, yes, I mean, my examination 5 does include, you know, other artifacts in the area where the 6 CSST is installed. So, for example, in this case we have a 7 number of conductor and coax cables. But, yes, I am also 8 familiar with the presence of and the type or nature of the 9 radiant barrier that was in the same area. So it is part of 10 my examination, but I certainly look at other fire 11 investigation origin determination factors, such as timeline 12 and witness statements, that support an origin determination 13 as any fire investigator would.</p> <p>14 Q. Right. And I'm not saying that you're not qualified 15 to do an N921 cause and origin analysis. I'm just pointing 16 out that that's not what you were retained to do here; is that 17 right?</p> <p>18 A. I would say my role is more specifically with 19 respect to the metallurgy and the root cause of the opening in 20 the corrugated stainless steel tubing in the defined area of 21 origin that has been identified by others. But I do include 22 in my analysis, with respect to not only confirming that the 23 opening is in the general area of origin, but also other 24 factors that support origin determination, including witness 25 statements and timeline. So I'm not trying to minimize my</p>	<p style="text-align: right;">20</p> <p>1 brought up on the screen, and that contains all of those 2 documents kind of together.</p> <p>3 A. You said that was Exhibit 5?</p> <p>4 Q. Yeah. It will ultimately will be Exhibit 5.</p> <p>5 A. Okay.</p> <p>6 Q. And I apologize for this, but we have had some 7 technical issues at the office over the last couple of days, 8 but what I have marked, or what will be marked as Exhibit 2 is 9 your CV. And I have that up on the screen right now. When is 10 the last time that your CV was updated?</p> <p>11 A. Well, I received the Professional Excellence Award 12 from the Michigan State Police in January of 2022, so likely 13 around that time or shortly thereafter.</p> <p>14 Q. Yeah, and tell me about that. I saw that referenced 15 in the report, and congratulation on that, but can you just 16 tell me a little bit more about, you know, what you did and 17 the award that you received.</p> <p>18 A. So the Michigan State Police detectives were 19 investigating a fatality, possible homicide, which involved a 20 woman that was found in her basement with an orange extension 21 cord tied around her neck, and there were two knots in it. 22 And so the Michigan State Police contacted me as a materials 23 engineer to, essentially, look at the physical evidence and 24 then opine on whether the properties of the extension cord 25 found around her neck were consistent with her having hung</p>

<p style="text-align: right;">21</p> <p>1 herself or not. And so all the work that I did for the</p> <p>2 Michigan State Police on behalf of Amy Allan was done pro</p> <p>3 bono. And then it ultimately resulted in the conviction of</p> <p>4 her husband for second degree murder.</p> <p>5 Q. And so that was not a fire case. It's a homicide</p> <p>6 involving, I guess, confirmed murder where this poor woman was</p> <p>7 hung?</p> <p>8 A. Yes. So I was, essentially, retained as a materials</p> <p>9 scientist to, you know, explain to the jury the difference</p> <p>10 between an extension cord and a rope, and then whether an</p> <p>11 extension cord would actually suspend, you know, the</p> <p>12 140 pounds that Mrs. Allan weighed at the time, and then what</p> <p>13 that extension cord, and specifically the knots, would look</p> <p>14 like had she hung herself. So it was really more as a</p> <p>15 materials engineer, you know, to assist the jury in describing</p> <p>16 the differences both, you know, physically between an</p> <p>17 extension cord and a rope, and what the appearance of the</p> <p>18 extension cord would look like had it been used in an actual</p> <p>19 hanging.</p> <p>20 Q. And that's listed on page 3 of your CV; is that</p> <p>21 right?</p> <p>22 A. Yes. And as I mentioned, I did not charge the</p> <p>23 Michigan State Police nor the family for any of the work that</p> <p>24 I performed.</p> <p>25 Q. Have you written any additional presentations or</p>	<p style="text-align: right;">23</p> <p>1 so that gas piping not only included CSST, but it also</p> <p>2 included black iron pipe and included plastic service lines</p> <p>3 and steel gas mains. So it was, essentially, the materials</p> <p>4 science examination of all forms of gas piping, but it did</p> <p>5 include CSST as well as gas appliance connectors.</p> <p>6 Q. And with respect to your -- that second</p> <p>7 presentation, how was black iron pipe involved with that</p> <p>8 presentation?</p> <p>9 A. Without looking at my presentation slides, I believe</p> <p>10 the reference I made to black iron pipe was pitting corrosion</p> <p>11 in a steel main that was outside of a home where the gas from</p> <p>12 the steel main was allowed to migrate into the home that</p> <p>13 resulted in an explosion.</p> <p>14 And then the second one that comes to mind is</p> <p>15 another residential explosion where we had pretty serious -- I</p> <p>16 would call it general corrosion to the 1-inch steel gas line.</p> <p>17 Again, that was outside, but the openings in the black pipe</p> <p>18 were determined to be post explosion and not pre explosion.</p> <p>19 Q. And so in that second -- that residential explosion,</p> <p>20 I guess you ultimately offered the opinion that the black iron</p> <p>21 pipe was a victim of the fire, not a cause of it?</p> <p>22 A. That's correct.</p> <p>23 Q. Are you currently working on any matters involving</p> <p>24 gas leaks from black iron pipe?</p> <p>25 A. Not that come to mind.</p>
<p style="text-align: right;">22</p> <p>1 articles since 2019?</p> <p>2 A. I believe I have given some presentations, but the</p> <p>3 only other article referenced above is the chapter that I</p> <p>4 wrote in the latest edition of the Fire Protection Handbook on</p> <p>5 oxidizers.</p> <p>6 Q. When you say that you have given presentations in</p> <p>7 the last -- let's just go with the last two years. Have you</p> <p>8 given any presentations that in any way relate to CSST?</p> <p>9 A. Yes.</p> <p>10 Q. And how many?</p> <p>11 A. One.</p> <p>12 Q. And tell me about that presentation.</p> <p>13 A. Make that two.</p> <p>14 Q. Okay. Tell me about those. Is it the same</p> <p>15 presentation, or are they two different presentations?</p> <p>16 A. They're different presentations. The first one I</p> <p>17 presented, I believe, for three hours at what is called the</p> <p>18 Michigan Arson School. And the topic was corrugated stainless</p> <p>19 steel tubing, I believe, fires, and characteristics of</p> <p>20 corrugated stainless steel tubing to assist fire investigators</p> <p>21 with, you know, either making that determination, or at least</p> <p>22 putting it on their radar.</p> <p>23 And then the second one is, I believe I gave five</p> <p>24 hours of training to the Texas State Fire Marshal's Office</p> <p>25 fire investigators on materials science and gas piping. And</p>	<p style="text-align: right;">24</p> <p>1 Q. In the last two years, have you worked on any</p> <p>2 matters involving gas leaks in black iron pipe?</p> <p>3 A. The one with the post-explosion damage to the</p> <p>4 uniform corrosion to the gas main, I believe that concluded</p> <p>5 within the last two years. But since then, none come to mind.</p> <p>6 Q. From your -- to your recollection, what was the</p> <p>7 cause of the fire in that residential explosion?</p> <p>8 A. It was, essentially, the accumulation and ignition</p> <p>9 of unodorized butane during illegal marijuana processing</p> <p>10 activities inside the same home at the time.</p> <p>11 Q. And was there a lawsuit, or was this just an</p> <p>12 investigation?</p> <p>13 A. So, certainly, the Oakland County sheriff's Office</p> <p>14 was involved to some extent because of the activities, but I</p> <p>15 was retained by Farm Bureau Insurance that had insured part of</p> <p>16 the structure.</p> <p>17 Q. And was there any litigation involved, or was this a</p> <p>18 pre-litigation investigation?</p> <p>19 A. I believe they ultimately settled.</p> <p>20 Q. Do you recall if you were deposed in that matter?</p> <p>21 A. The opposing counsel for the plaintiff did not want</p> <p>22 to pay for my deposition, so no, I was not deposed.</p> <p>23 Q. Did you issue a report in that matter?</p> <p>24 A. I believe I did, yes.</p> <p>25 Q. I assume that there was a report from the opposing</p>

<p style="text-align: right;">25</p> <p>1 side that corrosion caused the black iron pipe to fail; is</p> <p>2 that right?</p> <p>3 A. Based on my recollection, I only recall that the</p> <p>4 fire investigator for the plaintiff did not complete his</p> <p>5 investigation, and any report he prepared was preliminary and</p> <p>6 really did not include the results of the laboratory</p> <p>7 examination, including microscopy of the openings in that</p> <p>8 black pipe where an alleged leak occurred but was determined</p> <p>9 to be post explosion. So his report, I think, was preliminary</p> <p>10 and incomplete.</p> <p>11 Q. Do you recall the name of the investigator?</p> <p>12 A. Not off the top of my head, but he was from SEA</p> <p>13 Limited, I believe, out of Ohio.</p> <p>14 Q. Do you recall the name of that lawsuit?</p> <p>15 A. I don't recall how to spell the first name of the</p> <p>16 insured, but the first initial would be L, as in Larry, and</p> <p>17 then the last name was Krykun, K-R-Y-K-U-N.</p> <p>18 Q. And --</p> <p>19 A. And that was in Palmer Township, Michigan.</p> <p>20 Q. And who was Farm Bureau's insured in that matter?</p> <p>21 A. So the specifics of who insured what and how is not</p> <p>22 obvious to me, but I think there was an insurance policy for</p> <p>23 the structure, and then there was another insurance policy</p> <p>24 either for the contents or the occupant. But I believe Farm</p> <p>25 Bureau Insurance had some part of the policy with respect to</p>	<p style="text-align: right;">27</p> <p>1 Allan. Is that the murder case that you worked on pro bono?</p> <p>2 A. Yes, that is the murder trial.</p> <p>3 Q. And I think I just said that it was three trials,</p> <p>4 but it looks like there's four, so I apologize for that. The</p> <p>5 matter above it, the Farm Bureau of Michigan case, what was</p> <p>6 that matter about?</p> <p>7 A. So the Nikola Dedivanaj was a fraudulent water</p> <p>8 damage claim. I was working on behalf of Farm Bureau</p> <p>9 Insurance.</p> <p>10 Q. When you say fraudulent water damage, what was at</p> <p>11 issue in that matter?</p> <p>12 A. So a braided stainless steel water supply line to a</p> <p>13 bidet was found separated from the barbed fitting, which would</p> <p>14 not occur as a result of exposure to freezing temperatures,</p> <p>15 but could be manipulated and separated resulting in the</p> <p>16 release of water into the structure.</p> <p>17 Q. And you were retained by Farm Bureau in that case;</p> <p>18 is that right?</p> <p>19 A. Yes.</p> <p>20 Q. The next case, State Farm vs. USA Insulation, what</p> <p>21 did that matter involve?</p> <p>22 A. So I was working on behalf of State Farm for the</p> <p>23 insured, the Rotts. And, essentially, this was in support of</p> <p>24 a fire investigation that occurred shortly after blow-in foam</p> <p>25 insulation had been installed that then transitioned to</p>
<p style="text-align: right;">26</p> <p>1 the structure.</p> <p>2 Q. And so, presumably, you were working on behalf of</p> <p>3 the homeowner or the premises owner; is that right?</p> <p>4 A. Again, I was essentially retained by Farm Bureau to</p> <p>5 perform an origin and cause investigation. They may have</p> <p>6 ultimately denied the claim, but initially I was performing a</p> <p>7 site investigation and a laboratory examination of evidence</p> <p>8 from that site.</p> <p>9 Q. Got it. The decedent, was it a homeowner, a gas --</p> <p>10 renter?</p> <p>11 A. So no one died, but two young men who were likely in</p> <p>12 the act of processing marijuana were seriously injured. One,</p> <p>13 I think, may have resulted in a personal amputation of his</p> <p>14 leg, and the other one, I think, hit his head pretty hard.</p> <p>15 Q. I am now at the -- your trial testimony -- and the</p> <p>16 list of your deposition and trial testimony, again, I'll mark</p> <p>17 as Exhibit 3. I'll have to do that after the break.</p> <p>18 But since I deposed you back in the Williams</p> <p>19 matter -- and let me just get the date on the record so we can</p> <p>20 work from there. So it looks like the last time we talked was</p> <p>21 May in 2021. So I just briefly want to go over the testimony</p> <p>22 that you have offered since that time. All right?</p> <p>23 A. Sure.</p> <p>24 Q. So it looks like you have been deposed in three</p> <p>25 different trials, the first being People vs. James David</p>	<p style="text-align: right;">28</p> <p>1 flaming combustion that resulted in a fire at the Rott home.</p> <p>2 Q. And the spray foam, if it was within your opinion,</p> <p>3 did you have any opinion as to how the spray foam ignited?</p> <p>4 A. So it was a combination of not only literature</p> <p>5 search as well as a review of the technical information for</p> <p>6 similar two-part spray foams, but also laboratory testing</p> <p>7 where we were able to, essentially, achieve conditions whereby</p> <p>8 the foam self-heated and transitioned to the point of flaming</p> <p>9 combustion in the time frame of the fire that occurred at the</p> <p>10 Rott home.</p> <p>11 Q. And so did I have it correct that you performed your</p> <p>12 own lab testing with this two-part spray foam in order to get</p> <p>13 ignition?</p> <p>14 A. So we did a series of tests using, like, a faux wall</p> <p>15 with different thicknesses of the foam application. We did a</p> <p>16 variety of different, like, boxes which would simulate</p> <p>17 improper installation because of the overall thickness and,</p> <p>18 you know, instrumented with thermocouples to show that you can</p> <p>19 have the accumulation of heat under those conditions. And</p> <p>20 then ultimately we did a 30-inch square box filled with</p> <p>21 two-part sprayed foam that then transitioned to flaming</p> <p>22 combustion within two hours after the spray foam was added.</p> <p>23 So we did a series of tests and collected data with the same</p> <p>24 foam that was used in the Rott home on the day of the fire.</p> <p>25 Q. Understood. So, in that case, you tested your</p>

<p style="text-align: right;">29</p> <p>1 ignition theory to establish that it could happen; is that 2 right?</p> <p>3 A. That it could happen with the subject foam that was 4 being used, and it was entirely consistent with existing 5 literature, yes.</p> <p>6 Q. The case above it, Salvatore Dinoto v. Farm Bureau, 7 were you retained by Farm Bureau in that case?</p> <p>8 A. Yes, and this is another fraudulent water damage 9 claim.</p> <p>10 Q. And what opinions did you offer in that case?</p> <p>11 A. So based on my investigation and review of the 12 physical evidence from this particular loss site, the plastic 13 nut associated with the toilet water supply line had been 14 physically unthreaded from the shank of the toilet fill valve 15 assembly which then allowed water to flow into the structure.</p> <p>16 Q. So very similar to the claim in the prior matter of 17 Nikola -- I'm going to butcher the last name, but that prior 18 matter that we discussed?</p> <p>19 A. There were definitely some similarities, yes, but 20 the ultimate alleged failure was different.</p> <p>21 Q. I'm going to go down to your deposition testimony. 22 The Barnhart v. Property Owners Insurance matter, do you 23 recall who you worked for in that case?</p> <p>24 A. Yes, I was working on behalf of the Barnharts.</p> <p>25 Q. And what did that dispute involve?</p>	<p style="text-align: right;">31</p> <p>1 panel that then resulted in a fire.</p> <p>2 Q. How often -- well, strike that. Do you know how 3 many current matters you have open for Farm Bureau?</p> <p>4 A. I have not counted, but I would say currently five 5 or less.</p> <p>6 Q. Back to Farm Bureau v DJG Mechanical, what do you 7 recall about that case?</p> <p>8 A. So Mr. Reemer had a ginormous home here in Southeast 9 Michigan, and there was some ongoing renovations that were 10 performed, and the installers of some copper wire supply lines 11 failed to properly insulate them, and they burst and froze and 12 caused significant damage to this ginormous home.</p> <p>13 Q. So that's a water damage case; is that right?</p> <p>14 A. Yes.</p> <p>15 Q. The matter above it, Randy Davis v. Harley-Davidson, 16 who retained you in that matter?</p> <p>17 A. So I was working for counsel on behalf of Mr. Davis 18 who was on his Harley-Davidson going down the expressway when 19 a fire erupted between his legs causing him to dump the bike 20 on the side of the road and that resulted in additional 21 significant physical injuries to him. And so I identified the 22 root cause of the failure of the Harley-Davidson motorcycle 23 that resulted in the release and ignition of gasoline.</p> <p>24 Q. And what was your opinion as to what the failure was 25 with the Harley-Davidson motorcycle?</p>
<p style="text-align: right;">30</p> <p>1 A. So there was an explosion at the Barnhart residence 2 that resulted from the self-loosening of an improperly 3 installed drip leg associated with the furnace in their 4 basement. So it had been unloosening over time. And on the 5 day of the incident, it fell from the T in the gas piping to 6 the furnace, and then you had the release and accumulation of 7 natural gas in the home, and then the home exploded, and 8 fortunately, the Barnharts were not home when that occurred.</p> <p>9 Q. And what was the ignition source in that matter?</p> <p>10 A. I believe, based on my recollection, the most likely 11 ignition source was the pilot light of the gas-fired water 12 heater in the same utility room as the furnace and its gas 13 piping.</p> <p>14 Q. The matter above it, Farm Bureau v. DJG Mechanical, 15 I'm assuming that you were retained by Farm Bureau in that 16 matter; is that right?</p> <p>17 A. Well, you missed one. It's another Farm Bureau 18 matter versus TNT Equipment.</p> <p>19 Q. Let's go to that one. Thank you.</p> <p>20 A. Okay.</p> <p>21 Q. Can you tell me about that case?</p> <p>22 A. I believe I was retained by attorneys representing 23 TNT Equipment. I can't be sure, but this essentially involved 24 the root cause of a -- for lack of a better word -- a 25 melt-through or a blowhole behind an electrical distribution</p>	<p style="text-align: right;">32</p> <p>1 A. Sure. There was a design defect in the fuel line, 2 essentially under the fuel tank.</p> <p>3 Q. Maxwell Smith v. Sherwin-Williams, who retained you 4 in that case?</p> <p>5 A. I was working for counsel on behalf of Mr. Smith.</p> <p>6 Q. And what did that dispute involve?</p> <p>7 A. So Mr. Smith had purchased a brand new can of 8 khaki-colored spray point, went home to his workshop, 9 inadvertently dropped it and it blew up and it punched him in 10 the face. The can punched him in the face and he had 11 significant orbital injuries. And so I examined the subject 12 can to arrive at the root case of its failure and his 13 injuries.</p> <p>14 Q. And in your opinion, what was the root case of the 15 failure of that can?</p> <p>16 A. It was a design defect.</p> <p>17 Q. The case above it, Liberty Insurance vs. Titeflex, 18 I'm assuming you were retained by Liberty Insurance; is that 19 right?</p> <p>20 A. That's correct.</p> <p>21 Q. And do you recall was this a CSST case?</p> <p>22 A. This was a CSST case that resulted from improper 23 installation of the FlashShield.</p> <p>24 Q. And when you say "improper installation" -- well, 25 was there -- was this a lightning fire or, like, an</p>

<p style="text-align: right;">33</p> <p>1 electrical fault fire?</p> <p>2 A. Based on my recollection, this was</p> <p>3 lightning-induced failure, but the failure ultimately</p> <p>4 occurred because the FlashShield was not properly installed.</p> <p>5 Q. And so in that matter, my recollection is that they</p> <p>6 cut the jacket a little too short, that left a gap between the</p> <p>7 jacket of the FlashShield and the fitting, and an arc occurred</p> <p>8 there, and that's where the fire originated; is that right?</p> <p>9 A. That's a fair summary of that particular case, yes,</p> <p>10 but I think they -- you know, you have to include the mesh was</p> <p>11 not engaged by the nut. So it wasn't just the jacket. It was</p> <p>12 the aluminum mesh was not engaged by the nut that then allowed</p> <p>13 it to fail as if it were -- if the aluminum mesh was not</p> <p>14 present.</p> <p>15 Q. And so there -- well, did you offer any opinion</p> <p>16 regarding the design of the FlashShield product?</p> <p>17 A. I would have to review my opinions in that case, but</p> <p>18 I think ultimately, as I do in this and other CSST cases, was</p> <p>19 to essentially examine the openings in the CSST and determine</p> <p>20 the root cause as well as contributing factors. I don't</p> <p>21 recall specifically having any design opinions in that</p> <p>22 specific case.</p> <p>23 Q. Do you recall if you offered any opinion that the</p> <p>24 product was improperly installed?</p> <p>25 A. I believe so, yes, but I'd have to review my report</p>	<p style="text-align: right;">35</p> <p>1 mitigate against electrical arcing events?</p> <p>2 A. Based on my review of literature, I don't know that</p> <p>3 that is a true statement in all cases, but I would certainly</p> <p>4 defer to Kelly Colwell on the bonding and grounding issues in</p> <p>5 this case.</p> <p>6 Q. The June 2022 matter, In Re: January 24th explosion</p> <p>7 litigation, do you see that?</p> <p>8 A. Yes.</p> <p>9 Q. And what does that matter involve?</p> <p>10 A. So there was a large explosion in Houston, Texas,</p> <p>11 that resulted in four fatalities and over \$40 million in</p> <p>12 property damage because of the unmitigated release of</p> <p>13 propylene gas inside a structure that had definite design</p> <p>14 issues. And I was retained as a subject matter expert in</p> <p>15 metallurgy by a -- I guess it would be like a consortium of</p> <p>16 insurance companies to investigate that loss.</p> <p>17 Q. And so are you on the plaintiff's subrogation side</p> <p>18 or on the defense side of that matter?</p> <p>19 A. The plaintiff's subrogation side.</p> <p>20 Q. And what opinions did you ultimately render in that</p> <p>21 matter?</p> <p>22 A. I'd have to review my report for the specifics of my</p> <p>23 opinions, but essentially the first fuel ignited was a</p> <p>24 propylene oxygen or propylene air mixture. There were</p> <p>25 multiple potential ignition sources inside the structure that</p>
<p style="text-align: right;">34</p> <p>1 and opinions.</p> <p>2 Q. Here you don't offer any opinions regarding the</p> <p>3 installation of the CSST at the Diel home; is that right?</p> <p>4 A. I believe that's correct, yes.</p> <p>5 Q. And the CSST at the Diel home was not bonded to the</p> <p>6 home's grounding electrode; is that correct?</p> <p>7 MR. CATHCART: Object to the form.</p> <p>8 THE WITNESS: So I would defer to Mr. Kelly about</p> <p>9 the nature of the bonding and grounding, but I don't</p> <p>10 recall seeing the bond connection at the outlet or the</p> <p>11 inlet of the service to the Diel home, that's correct.</p> <p>12 Q. (By Mr. Guilmartin) And so in the Liberty Insurance</p> <p>13 case, you opined that it was improperly installed and that</p> <p>14 resulted in this electrical arc. Is it that you were not</p> <p>15 retained to look at the installation here and whether or not</p> <p>16 there was any correlation between the improper installation</p> <p>17 and the cause of the fire?</p> <p>18 A. So there's a lot with respect to installation. In</p> <p>19 the Jester case specifically, it was the failure to engage the</p> <p>20 aluminum mesh under the nut that compromised the integrity of</p> <p>21 that particular product under lightning strike conditions.</p> <p>22 So while that is installation related, I didn't opine on the</p> <p>23 bonding and grounding in that instance.</p> <p>24 Q. But in this case, the bonding -- well, would you</p> <p>25 agree with me that the bonding of CSST is required in order to</p>	<p style="text-align: right;">36</p> <p>1 could ignite that mixture. And the root cause was essentially</p> <p>2 the separation of a rubber hose from its fitting that allowed</p> <p>3 that unmitigated release of propylene into the structure. I</p> <p>4 may have had additional opinions about ways that this could</p> <p>5 have been mitigated by those who distributed the propylene gas</p> <p>6 but, you know, it was essentially origin and cause and</p> <p>7 contributing factors as a materials scientist.</p> <p>8 Q. The Patricia Allen matter, who retained you in that</p> <p>9 case?</p> <p>10 A. I was retained by counsel for Brewer's, Inc., a</p> <p>11 defendant.</p> <p>12 Q. And what was the nature of your retention in that</p> <p>13 case?</p> <p>14 A. So, Mr. Allen was driving -- as a passenger in his</p> <p>15 truck down the road when a fragment of a wheel from the Arbor</p> <p>16 Springs Water Company truck was projectiled through the</p> <p>17 windshield, and it essentially cut his jugular, and he bled</p> <p>18 out and died as a result of that incident. Brewer's, Inc.,</p> <p>19 was a tow truck company that was actually towing the Arbor</p> <p>20 Springs Water truck at the time the piece of steel separated</p> <p>21 from the rim and then was projectiled into the windshield of</p> <p>22 that vehicle.</p> <p>23 Q. In the matter above it, Michigan Municipal League v.</p> <p>24 Lake State Roofing, who retained you in that case?</p> <p>25 A. I was working on behalf of the plaintiff, Michigan</p>

<p style="text-align: right;">37</p> <p>1 Municipal League.</p> <p>2 Q. And what did that dispute involve?</p> <p>3 A. So that is a roof fire, and the most likely cause,</p> <p>4 based on my investigations as well as laboratory testing, was</p> <p>5 the ignition of high-surface area fiberboard from a careless</p> <p>6 discarded cigarette into a bucket.</p> <p>7 Q. The matter above it, State Farm v. BSH Home</p> <p>8 Appliance, I'm assuming that you were retained by State Farm?</p> <p>9 A. Yes.</p> <p>10 Q. And what opinions did you offer in that case?</p> <p>11 A. In the case of State Farm on behalf of Mr. Hayes,</p> <p>12 this was, I believe, a dishwasher fire. And I was retained as</p> <p>13 a metallurgist to perform an examination of electrical</p> <p>14 artifacts associated with the subject dishwasher and opine on</p> <p>15 the cause of the damage to those electrical fire -- electrical</p> <p>16 artifacts.</p> <p>17 Q. So this was a fire at an appliance; is that right?</p> <p>18 A. Yes.</p> <p>19 Q. And specifically what opinions did you offer in that</p> <p>20 case?</p> <p>21 A. That the localized damage to the electrical</p> <p>22 artifacts from that appliance was a cause of the fire as</p> <p>23 opposed to a victim.</p> <p>24 Q. And how were you able to differentiate the evidence</p> <p>25 of electrical arcing as a cause of a fire versus being a</p>	<p style="text-align: right;">39</p> <p>1 that the damage was consistent with arcing, and then he had to</p> <p>2 apply that information in the analysis of the fire involving</p> <p>3 that appliance.</p> <p>4 Q. Okay. And so it sounds like it was your opinion</p> <p>5 that there was localized arcing consistent with an arc event</p> <p>6 versus, I guess, damage caused by the fire; is that right?</p> <p>7 A. That's correct.</p> <p>8 Q. But certainly the expert that you were working with,</p> <p>9 the electrical engineer then opined that that arcing event was</p> <p>10 a competent ignition source; is that right?</p> <p>11 A. That's most likely, yes.</p> <p>12 Q. And he --</p> <p>13 A. He took the data. Yeah, he took the data that I</p> <p>14 generated and applied that data in his analysis of the fire</p> <p>15 scene.</p> <p>16 Q. And here we have evidence of multiple arc sites on</p> <p>17 the electrical conductors; is that right?</p> <p>18 A. Not only within the area of origin but remote from</p> <p>19 the area of origin, that's correct.</p> <p>20 Q. And would you agree with me that each of those</p> <p>21 arcing events is a competent ignition source?</p> <p>22 A. Under some conditions, yes. In this case, no, they</p> <p>23 are victims of an existing fire.</p> <p>24 Q. And so in BSH Home, it was your opinion that those</p> <p>25 arc events caused a fire, or at least it was the electrical</p>
<p style="text-align: right;">38</p> <p>1 victim of the fire?</p> <p>2 A. So the damage to the electrical artifact was very</p> <p>3 localized, and in comparison with an intact similar connector,</p> <p>4 the location of, I'll say, the melt separation was consistent</p> <p>5 with an arc event as opposed to attack by fire or eutectic</p> <p>6 melting or any other cause of localized damage to an artifact.</p> <p>7 Q. Would you agree with me that here at the Diel home</p> <p>8 that we have evidence of localized arcing events?</p> <p>9 A. So I am very familiar and am often retained to</p> <p>10 characterize damage to electrical conductors from fire scenes</p> <p>11 as well as damage to corrugated stainless steel tubing and gas</p> <p>12 appliance connectors from fire scenes. So, yes, I looked not</p> <p>13 only at the arc sites to the various copper conductors from</p> <p>14 the Diels scene, but also the arc site on the subject CSST.</p> <p>15 Q. But you would agree with me that there was localized</p> <p>16 evidence of arcing on the conductors in the area of origin; is</p> <p>17 that right?</p> <p>18 A. Not only in the area of origin, but remote from the</p> <p>19 area of origin, which supports arc mapping.</p> <p>20 Q. And would you agree -- well, in BSH Home Appliance,</p> <p>21 I'm assuming that it was your opinion that this arcing was a</p> <p>22 competent ignition source to start the fire; is that right?</p> <p>23 A. I was working closely with the electrical engineer</p> <p>24 that was retained on that fire, so I was participating more in</p> <p>25 characterizing the damage to the electrical artifact and found</p>	<p style="text-align: right;">40</p> <p>1 engineer's. But here it's the opposite opinion, your opinion</p> <p>2 is that the arcs were caused by the fire?</p> <p>3 MR. CATHCART: Object to the form.</p> <p>4 THE WITNESS: So every analysis I perform is done</p> <p>5 without bias or influence from previous cases. And one</p> <p>6 distinct difference I would make between that BSH Home</p> <p>7 Appliance matter is that this was a brass connection, not</p> <p>8 copper conductors. So there are printed circuit boards.</p> <p>9 They have, like, various brass fittings for plug-type</p> <p>10 attachments, and that's where this failure occurred. So</p> <p>11 this localized melting was to a brass component as</p> <p>12 opposed to household electrical, and it was associated</p> <p>13 with a connection at a printed circuit board in an</p> <p>14 appliance. So while arc damage can occur to various</p> <p>15 artifacts under electrical insults or from exposure to</p> <p>16 fire, every case where I see any localized melting, I</p> <p>17 apply the same methodology of failure analysis to</p> <p>18 determine whether it's a cause or a victim, and whether</p> <p>19 it's a credible ignition source based on other data from</p> <p>20 the fire scene.</p> <p>21 Q. (By Mr. Guilmartin) And we'll get into it a bit</p> <p>22 more later, but the arcs observed at the Diel home, you agree</p> <p>23 that's evidence of arcing, not evidence of fire damage; is</p> <p>24 that right?</p> <p>25 A. So there are a number of different ways that you can</p>

<p style="text-align: right;">41</p> <p>1 have localized damage to electrical conductors from fire 2 scenes, which includes mechanical, chemical, eutectic melting, 3 electrical, high-resistance connection. And so when I examine 4 the damage to any electrical conductor, I apply the same 5 methodology to determine the root cause. And then after that 6 root cause, coupled with my familiarity with arc mapping, then 7 you can take the data from that localized melting to determine 8 whether it confirms your area of origin or if it is a 9 competent ignition source for any other materials that are 10 available or not. So it's a culmination of the examination, 11 not only of the physical artifacts, but the environment and 12 the timeline associated with any particular fire, including 13 this one. 14 Q. Dr. Buc, again, we had this issue at your last 15 deposition. I mean, you go off on these tangents, and I would 16 appreciate if you would just answer the question because we 17 are losing a ton of time. I don't mean for this deposition to 18 be very long. I mean, I think I'm asking some questions that 19 are very pointed, and I think, you know, they are open to 20 simple yes or no. 21 So I'm going to ask this as a yes or no question. 22 The evidence of arcing on the electrical conductors at the 23 Diel home, is it -- would you agree with me that it was 24 cause -- that those anomalies on the conductors were caused by 25 arcing?</p>	<p style="text-align: right;">43</p> <p>1 water, as opposed to failed from any known metallurgical 2 means. 3 Q. And the matter above it, Privilege Underwriters vs. 4 Omega Flex, that's a CSST case; is that right? 5 A. Correct. 6 Q. And you represent, or you were retained by 7 Privileged Underwriters; is that right? 8 A. Correct. 9 Q. After that deposition in the Block matter, have you 10 done any additional work in that case? 11 A. Not that comes to mind, no. 12 Q. I'm going to go down, and I have a few more 13 questions before, and then we'll take a break. 14 What will be marked as Exhibit 4 is your rate sheet 15 for 2022. Have the rates changed at all for 2023? 16 A. No. While everything else has gone up in price, I 17 have kept my rates the same. 18 Q. I feel your pain there. And so I'm going to go back 19 up, and then we will take a break. But just for the record, 20 after -- when we come back, we'll get into your report. And 21 your report I have marked as Exhibit 5. Why don't we come 22 back at 11:20. Hopefully, I'll have some exhibits ready by 23 then and we can get into your report. 24 A. No problem. 25 MR. GUILMARTIN: Thanks everybody.</p>
<p style="text-align: right;">42</p> <p>1 MR. CATHCART: Object to the form. 2 THE WITNESS: Yes. 3 Q. (By Mr. Guilmartin) Okay. Thank you. But it's 4 your opinion that that arcing was not the cause of this fire? 5 A. Correct. 6 Q. The next matter, Crimson Exploration Operating vs. 7 Cudd Pumping Services, what was this matter about? 8 A. So I was retained by counsel for Cudd Pumping 9 Services in regards to the failure of an acid tank at a well 10 site in Midland, Texas, that resulted in the release of a 11 large volume of concentrated hydrochloric acid into the 12 environment. 13 Q. And what opinions did you offer in that matter? 14 A. That the acid tank that was holding the acid at the 15 time had defective coating that allowed that acid to corrode 16 an already compromised floor in the tank at the discharge end 17 of the tank. 18 Q. The matter above it, Latorski v. Meemic Insurance, 19 who retained you in this case? 20 A. So I was working on behalf of Meemic Insurance for 21 what ultimately turned out to be a fraudulent water damage 22 claim. 23 Q. And what opinions did you offer in that case? 24 A. That the valve on the second floor bathroom sink had 25 been manually disassembled, that allowed for the release of</p>	<p style="text-align: right;">44</p> <p>1 VIDEOGRAPHER: The time is 10:09 a.m. We are going 2 off the record. 3 4 (Off record, 10:09 a.m. to 10:22 a.m.) 5 6 VIDEOGRAPHER: The time is 10:22 a.m. Back on the 7 record. 8 Q. (By Mr. Guilmartin) Dr. Buc, during the break I was 9 able to pull down the exhibits. 10 Christine, I'm also told that they're uploaded to 11 Lexitas, so I will go through very quickly right now and just 12 kind of put into the record what we have so far. 13 And Dr. Buc, do you see a document on your screen 14 this is your deposition notice? 15 A. Yes. 16 MR. GUILMARTIN: Okay. And just for the record, we 17 are going to mark this as Exhibit 1. Next is your CV. 18 We are going to mark that as Exhibit 2. Next is your 19 deposition and trial testimony. We will mark that as 20 Exhibit 3. Then there is the rate sheet, which we marked 21 as Exhibit 4, and then I have your report, which I'll 22 leave up now, and I have marked this as Exhibit 5. 23 24 (Exhibits 1-5, Documents, marked for 25 identification)</p>

<p style="text-align: right;">45</p> <p>1 Q. (By Mr. Guilmartin) Dr. Buc, is this your report?</p> <p>2 A. Yes.</p> <p>3 Q. Does it contain the entirety of the opinions that</p> <p>4 you will be offering at trial in this case?</p> <p>5 A. Unless requested to do additional work, the answer</p> <p>6 is yes.</p> <p>7 Q. And would you agree with me that you have issued no</p> <p>8 rebuttal report and no supplemental report in this case?</p> <p>9 A. Not at this time, but if requested, then I would do</p> <p>10 so.</p> <p>11 Q. The report is dated March 3, 2023; is that right?</p> <p>12 A. Correct.</p> <p>13 Q. Do you recall if you received Curtis Ozment's report</p> <p>14 before or after you issued your report?</p> <p>15 A. I would have to do that research. I don't recall.</p> <p>16 Q. Okay, second page. You were retained by Farm</p> <p>17 Bureau; is that right?</p> <p>18 MR. CATHCART: Object to the form.</p> <p>19 THE WITNESS: I was retained by Farm Bureau of</p> <p>20 Oklahoma, that's correct.</p> <p>21 Q. (By Mr. Guilmartin) And with respect to the lab</p> <p>22 exam of all of the materials that you collected, they have</p> <p>23 been produced in your file; is that right?</p> <p>24 A. Yes.</p> <p>25 Q. And then you testified earlier, but you did take</p>	<p style="text-align: right;">47</p> <p>1 Q. -- find that the fire originated at the CSST?</p> <p>2 A. I don't think they do that level of detail, so the</p> <p>3 answer is no.</p> <p>4 Q. Do you recall if the Breckenridge Fire Department</p> <p>5 report references CSST at all?</p> <p>6 A. Again, I think it was a very high-level fire</p> <p>7 department report, but I don't recall them mentioning</p> <p>8 anything, you know, detailed investigation or CSST.</p> <p>9 Q. There is a listing of the various propane</p> <p>10 appliances. Where did you get that information from?</p> <p>11 A. That information, most likely, came from not only</p> <p>12 the Diel testimony but also the photographs of the fire scene</p> <p>13 and the different lengths of CSST that were collected.</p> <p>14 Q. And there is a reference to Zillow. Is it just that</p> <p>15 you went on Zillow to look at the house?</p> <p>16 A. Yes. I typically look on Zillow for not only the</p> <p>17 age of the structure, but also the general square footage.</p> <p>18 Q. There is a reference to Weather Underground. What</p> <p>19 is that?</p> <p>20 A. Your cursor is pointing to "Will Rogers World</p> <p>21 Airport Station in Oklahoma City, Oklahoma.</p> <p>22 Q. Right, but what is that? What is this a reference</p> <p>23 to?</p> <p>24 A. I'm looking at the weather records for the date of</p> <p>25 the fire.</p>
<p style="text-align: right;">46</p> <p>1 some notes at that lab exam; is that right?</p> <p>2 A. Yes.</p> <p>3 MR. GUILMARTIN: And I'll mark those as Exhibit 6.</p> <p>4 And they run from Bates Number Buc 153 through Buc 162.</p> <p>5</p> <p>6 (Exhibit 6, Notes, Buc_153 to Buc_162, marked for</p> <p>7 identification)</p> <p>8</p> <p>9 Q. (By Mr. Guilmartin) So Exhibit 6 that I have in</p> <p>10 front of me, are those your notes?</p> <p>11 A. I would clarify those are my handwritten notes</p> <p>12 during the laboratory examination, but I also include my</p> <p>13 photographs as well as the laboratory data that was collected</p> <p>14 during the same lab exam as part of my notes file.</p> <p>15 Q. Okay. And I see, for example, on this first page</p> <p>16 there is a discussion of the Breckenridge Fire Department</p> <p>17 report; is that correct?</p> <p>18 A. Yes.</p> <p>19 Q. Would you agree with me that in the report there is</p> <p>20 no discussion at all involving the CSST or the fire</p> <p>21 originating at the CSST; is that right?</p> <p>22 A. I am confused by your question. Can you ask that</p> <p>23 again?</p> <p>24 Q. Yeah. Did the Breckenridge Fire Department --</p> <p>25 A. Oh.</p>	<p style="text-align: right;">48</p> <p>1 Q. Got it. And so the data point for the weather</p> <p>2 report is from a nearby airport?</p> <p>3 A. That's correct. When you type in Enid, it sends you</p> <p>4 to the Will Rogers World Airport Station.</p> <p>5 Q. Got it. Then there are some notations regarding the</p> <p>6 deposition of Michael Diel; that right?</p> <p>7 A. That's correct.</p> <p>8 Q. There is a notation regarding Ballard Plumbing. Do</p> <p>9 you know if anybody has spoken to anybody at Ballard Plumbing?</p> <p>10 A. I have not.</p> <p>11 Q. Starting at page 6 of your notes, these are the</p> <p>12 notes from the lab exam; is that right?</p> <p>13 A. Yes. Just for clarification if you scroll up, do</p> <p>14 you have my notes from the deposition of Sondra?</p> <p>15 Q. I do. It's right here.</p> <p>16 A. Okay, sorry. Go ahead.</p> <p>17 Q. No, we have them, sorry. But starting at page 6,</p> <p>18 these are the notes from the lab exam?</p> <p>19 A. That's correct.</p> <p>20 Q. And I see that there's photos in the notes. Are</p> <p>21 those photos that you put in after the lab exam? How do you</p> <p>22 go about, I guess, writing the notes and getting the photos in</p> <p>23 your notes?</p> <p>24 A. I use an iPad, and the software that I use is called</p> <p>25 Note Taker HD, and that allows me, with an Apple pen, not only</p>

<p style="text-align: right;">49</p> <p>1 to write words and sentences, but also to import photographs</p> <p>2 that I take with the iPad.</p> <p>3 Q. Got it. So these are photos and notes that you're</p> <p>4 pulling together contemporaneously at the lab exam?</p> <p>5 A. In general, yes.</p> <p>6 Q. When you say "in general," how do I have it wrong?</p> <p>7 A. I may sit at the airport or on the airplane the same</p> <p>8 day as the lab exam, and kind of refine my notes. So</p> <p>9 contemporaneous is probably the same day as opposed to the</p> <p>10 same minute.</p> <p>11 Q. Got it. Page 7, there is a photograph. There is a</p> <p>12 notation regarding "very small hole." Do you see that?</p> <p>13 A. Yes.</p> <p>14 Q. Okay. And would you agree with me then that this</p> <p>15 was a very small hole?</p> <p>16 A. I have seen a range in areas of openings in CSST. I</p> <p>17 would consider this on the smaller side, yes.</p> <p>18 Q. And then there are some arrows to arc sites. Do you</p> <p>19 see that?</p> <p>20 A. Yes.</p> <p>21 Q. And above this, it says, "Electrical through area of</p> <p>22 origin." So you kind of put together the conductors in the</p> <p>23 CSST, and this is generally how it was configured in the attic</p> <p>24 space of the Diel home; is that right?</p> <p>25 A. In general, yes. I would defer to Mr. Colwell's</p>	<p style="text-align: right;">51</p> <p>1 event that started this fire; is that right?</p> <p>2 A. I would agree with that, yes.</p> <p>3 Q. And I think that's your opinion, too; is that</p> <p>4 correct?</p> <p>5 A. We reached that opinion independently, but yes, I</p> <p>6 don't agree with that -- or I don't disagree with that.</p> <p>7 Q. And so it's your opinion that the CSST was energized</p> <p>8 by this lightning strike, and then there was arcing to a coax</p> <p>9 cable and perhaps something else; is that right?</p> <p>10 A. The "something else" is the release and ignition of</p> <p>11 propane gas that then started a fire in this area, yes.</p> <p>12 Q. And in your scenario, how did the CSST get energized</p> <p>13 in the first instance?</p> <p>14 A. So there is a recorded direct strike and evidence of</p> <p>15 an attachment point from lightning to the same structure.</p> <p>16 Q. But how did it make its way from the attachment</p> <p>17 point on the gable to the -- and then energize the CSST?</p> <p>18 A. So we know that lightning, when it enters a</p> <p>19 structure, takes multiple paths to ground. I can't say in</p> <p>20 this particular instance I can draw that exact line, but there</p> <p>21 is definitely the correlation of a direct lightning strike</p> <p>22 from an attachment point to the roof as well as the STRIKENet</p> <p>23 report and this opening in the CSST. But I can't say -- I</p> <p>24 can't draw the line by which this particular lightning strike</p> <p>25 in its multiple paths to ground interacted with the CSST.</p>
<p style="text-align: right;">50</p> <p>1 photographs, but yes.</p> <p>2 Q. And the two arc sites that you're noting, would you</p> <p>3 agree with me that you are conceding that these are arc sites?</p> <p>4 A. Yes.</p> <p>5 Q. And what type of electrical conductors am I looking</p> <p>6 at?</p> <p>7 A. So the solid conductors are part of Romax, which may</p> <p>8 be three or four wires, and there were a total of four runs of</p> <p>9 Romex through the area. The picture below shows it a little</p> <p>10 more spread out.</p> <p>11 Q. Got it. So the two, I guess, groupings of</p> <p>12 conductors on the top photographs, those are both sets of</p> <p>13 Romex wires; is that right?</p> <p>14 A. There may be some coax cables and CAT 5 cable</p> <p>15 coupled therein. But in general, yes, you're looking at solid</p> <p>16 copper conductors from Romex.</p> <p>17 Q. And so we have arc sites both -- we have arc sites</p> <p>18 in close proximity to the hole in the CSST; is that right?</p> <p>19 A. Sure.</p> <p>20 Q. And at least with respect to Exponent, Exponent's</p> <p>21 opinion is that the arcing was from these Romex wires to the</p> <p>22 CSST during the course of this building fire; is that right?</p> <p>23 A. That's my understanding of their report, yes.</p> <p>24 Q. And it's Kelly's opinion that these arc sites that</p> <p>25 are near the CSST were not involved with the initial arcing</p>	<p style="text-align: right;">52</p> <p>1 Q. But we do know that the household electrical system</p> <p>2 was energized by this lightning strike; is that correct?</p> <p>3 A. The house was energized at the time, yes.</p> <p>4 Q. Yeah, and there's damage to the electrical system</p> <p>5 outside the area of origin; is that right?</p> <p>6 A. Yes. I recall there is one, I think, receptacle</p> <p>7 that showed some kind of damage, but it didn't result in a</p> <p>8 propagating fire.</p> <p>9 Q. Okay. So we have independent evidence, other than</p> <p>10 the fire, that the electrical system was energized as a result</p> <p>11 of the lightning strike; is that correct?</p> <p>12 A. At least in that particular circuit, yes.</p> <p>13 Q. What -- in your opinion what is the opposing</p> <p>14 electrode for this arcing event from the CSST?</p> <p>15 A. Well, I look at, essentially, you know, the overall</p> <p>16 appearance of the opening, both before and after cleaning, the</p> <p>17 size, the number, the location, various artifacts in the area,</p> <p>18 and then the detailed chemistry by EDS as well as ICP. And in</p> <p>19 this particular case, I think the most likely corresponding</p> <p>20 electrode is the aluminum shield from one of the coax cables.</p> <p>21 Q. Was there anything else involved in this arcing</p> <p>22 event?</p> <p>23 A. Just the lightning event.</p> <p>24 Q. Your report had some notation regarding, I think,</p> <p>25 elevated levels of zinc; is that right?</p>

<p style="text-align: right;">53</p> <p>1 A. Well, I consider them elevated. Obviously, from the 2 ICP of the base metal chemistry of the subject CSST, there is 3 no zinc. And I believe in only one of the 14 spectra 4 collected by EDS, there was one indication of zinc. 5 Q. The coax cable, that's the opposing electrode, what 6 did that run to and from? 7 A. I didn't trace it, per se, but the pre-removal 8 photographs show it's in intimate contact with the three runs 9 of CSST in the area. 10 Q. As are the Romex wires that are depicted in the 11 photo that I have up on the screen; is that right? 12 A. Sure, but the on-site photographs show, essentially, 13 the aluminum right at the pink zip ties where the opening in 14 the CSST was identified by leak testing before anything was 15 removed. 16 Q. In the photos at the scene, the hole is on the 17 opposite side as the coax cables; is that right? 18 A. They're in the same location, but yes, it appears 19 that the opening is perhaps oriented, I would say, you know, 20 not strictly up, but not in contact with the aluminum at that 21 location. 22 Q. Right. And so the assumption is that during the 23 course of the fire, things moved a little bit; is that right? 24 A. It could be from the application of water from 25 Mr. Diel during the fire. It could have been, you know,</p>	<p style="text-align: right;">55</p> <p>1 consumes the electrical wires resulting in arcing between the 2 electrical components and the CSST. You disagree that arc 3 mapping supports Exponent's version of events as well? 4 A. Right. Yes, I disagree with their -- not only that 5 ignition scenario but the use of arc mapping in that respect 6 as well. 7 Q. And then why would arc mapping not support their 8 position? 9 A. Because I don't think that whole sequence of events 10 you just described, which is their ignition scenario, were to 11 have occurred in four minutes or less. 12 Q. The radiant barrier, it's combustible; is that 13 right? 14 A. There are components of the radiant barrier that are 15 combustible, but the fiberglass is not. 16 Q. And in your test that you ran in the lab, when you 17 had ignition at the radiant barrier, how quickly did it burn? 18 A. Are you referring to the demonstration we performed 19 at Integrity? 20 Q. Correct. 21 A. I don't know that I recorded a rate. 22 Q. Would you agree with me that in that test, the 23 radiant barrier was readily combustible? 24 A. Under the conditions of the test with that ignition 25 source, sure.</p>
<p style="text-align: right;">54</p> <p>1 during the fire investigation process. But the photographs 2 as, you know, best we can tell from that evidence collection 3 and documentation shows aluminum, essentially, in the area of 4 the opening. 5 Q. But you would agree with me within that same area 6 there is evidence of arcing on the Romex wires; is that right? 7 A. Yes. 8 Q. Top of page 9 you note that there is radiant barrier 9 in the attic space. Do you see that? 10 A. Yes, that was part of the evidence collected. 11 Q. And it says, "Arc sites downstream." What do you 12 mean by that? 13 A. So the diagram, in general, essentially shows we saw 14 multiple arc sites in the area where the CSST was perforated, 15 but we also saw an arc site remote from that, which supports 16 arc mapping. 17 Q. And when you say that it "supports arc mapping," 18 what do you mean by that? 19 A. So arc mapping is, essentially, identified by NFPA 20 921 in the Patterns chapter where you can look at damage to 21 energized conductors to establish an area of origin as well as 22 flame spread. 23 Q. Right, but -- well, wouldn't arc mapping also 24 support Exponent's opinion if an arc occurred down low, where 25 my cursor is, the fire spreads up the radiant barrier, then</p>	<p style="text-align: right;">56</p> <p>1 Q. And the ignition source in that test was an arching 2 event; is that right? 3 A. I don't know if it was an arcing event or a torch or 4 lighter. I would have to review those -- that data. 5 Q. You don't recall if there was an arcing event at the 6 clip and that allowed the fire to propagate along the radiant 7 barrier? 8 MR. CATHCART: Object to form. 9 THE WITNESS: Again, I don't recall the 10 demonstration we performed in the lab, but I thought the 11 ignition source was an open flame. 12 Q. (By Mr. Guilmartin) So going back to the arc 13 mapping, it sounds like you disagree that arc mapping supports 14 their position because you disagree with the predicate, which 15 is that this was the first arc; is that right? 16 A. Correct. 17 Q. Okay. You write, "Corresponding electrode not known 18 with certainty." Why do you write that? 19 A. That was at the time of the laboratory examination, 20 and then subsequent to my review of all additional data, the 21 most likely corresponding electrode based on the chemistry is 22 aluminum based, and that would likely come from the shield of 23 the coax cable as opposed to the radiant barrier. 24 Q. Just looking at your diagram at page 9, just so that 25 we're on the same page, it's your and Integrity's and Ozment's</p>

<p style="text-align: right;">57</p> <p>1 opinion that arcing event occurred up more toward, I guess, 2 the peak of the roof, and then the fire spread down and caused 3 this arc site down below? 4 A. That's correct. 5 Q. And up here where the CSST is, under your theory and 6 Integrity's theory, you would have a gas burning fire at the 7 start of this fire in this area; is that right? 8 A. Propane gas fueled fire, that's correct. 9 Q. Would you agree with me generally that a propane 10 fueled fire burns more quickly than a fire without propane? 11 A. That depends on orientation, ventilation, fuel load, 12 so I can't say I agree with that statement in a blank way. 13 But it's definitely the constant source of fuel for a fire 14 that can then spread to other nearby combustible materials, 15 sure. 16 Q. Did you look at the photos of this attic space, and 17 is it your opinion that the area of most damage is where the 18 hole in the CSST was found? 19 A. In general, yes. 20 Q. When you say "in general," what do you mean by that? 21 A. There's a lot of consumption to, essentially, the 22 wood framing in the area where that hole in the CSST is 23 located. 24 Q. And is it your opinion that that is the greatest 25 damage or the most consumed wood is in that area?</p>	<p style="text-align: right;">59</p> <p>1 A. I'd have to look at the relative location of things, 2 but my recollection from his deposition is he was applying 3 water to the roof in the area where he saw smoke. 4 Q. Right. But that area isn't where the hole in the 5 CSST was located; is that right? 6 A. If that's the case, that's where he was applying 7 water. 8 Q. Are you aware of any fully-consumed wood joist where 9 the -- I guess we'll call it the lone arc site is? 10 A. Based on my review of photographs, no, I did not 11 notice that, but I did notice that there is, you know, intact 12 jacket on the conductor in close proximity. But without 13 reviewing the photographs, it does not come to mind. And it 14 seems that I have the words "unburned wood framing" right 15 there. 16 Q. Yeah. Would it change your opinions at all if there 17 was a fully-consumed wood joist where you put "unburned wood 18 framing"? 19 A. No. 20 Q. Why not? 21 A. Because the fire spread in that location and could 22 involve other combustible materials. 23 Q. But there is no gas down here; is that right? 24 A. So the gas is going to deflect off some of the wood 25 framing in the area, but I would say that you definitely have</p>
<p style="text-align: right;">58</p> <p>1 A. It appeared to be, yes. 2 Q. And you weren't at the joint scene inspection; is 3 that correct? 4 A. I was not at the joint site inspection, but I did 5 review all of Integrity's photographs. 6 Q. Are you aware of any fully-consumed joist in any 7 other area below the hole in the CSST? 8 A. Not without reviewing the photographs; however, the 9 fast response of Mr. Diel in applying water through an opening 10 in the roof, I don't know that I would expect to have complete 11 consumption at least in this area, but I'd have to review the 12 photographs for any consumption elsewhere. 13 Q. But if there's a fire burning and there is a -- he 14 didn't turn off the valves, there would be constant -- under 15 your theory, there would be constant flow of gas in that area; 16 is that right? 17 A. And fire, yes, but he is still applying water, which 18 is going to reach some of the -- you know, the wood framing 19 and lumber, yes. 20 Q. How could he have applied any water to the area 21 where the hole in the CSST was? 22 A. He was, essentially, applying water through an 23 opening in the roof where he saw smoke. 24 Q. Right, but that's on the other side of the barrier 25 where the CSST ran through; is that right?</p>	<p style="text-align: right;">60</p> <p>1 constant fire up in the area of the CSST. And I can't give 2 you a dimension that is accurate, but there is definitely 3 going to be constant fire in the CSST, which is not far from 4 that location. But again -- 5 Q. How far is it? 6 A. I would say that that's probably on the order of 7 3 feet or less. 8 Q. And so it's your opinion that the gas fire was 9 somehow fueling a fire down where the lone arc site is? 10 A. Well, no. We have other combustible materials in 11 the area that are going to spread fire, but the origin of the 12 fire is at the gas from the CSST that continues to be fueled. 13 But my diagram also notes that you still have just melted 14 aluminum as well as unburned wood framing at that location, 15 the general location of that arc site. 16 Q. Okay. Would you agree with me that none of the wood 17 joists in the vicinity of the CSST were fully consumed? 18 A. Based on my recollection and review of the 19 photographs, I think that's correct. 20 Q. They were charred; is that right? 21 A. Some of them are heavily charred with mass loss, 22 yes. 23 Q. But the mass loss certainly didn't fully consume any 24 portions of those wood joist members; is that right? 25 A. Sure.</p>

<p style="text-align: right;">61</p> <p>1 Q. And the fire department reported very quickly to 2 this fire; is that right?</p> <p>3 A. Let's see. Based on my notes on page 1, it says 4 they received the call at 22:48 or 10:48 p.m. They were out 5 or responding, in the process of responding, at 10:54 and they 6 arrived on scene at 10:57, but the call to 911 was only four 7 minutes after the lightning strike.</p> <p>8 Q. Right. So from the time of the lightning strike 9 until the time the fire department reported to the home, we're 10 talking less than an hour; is that right?</p> <p>11 A. We're talking less than 20 minutes.</p> <p>12 Q. Less than 20 minutes. Have you seen prior testing 13 performed by Integrity related to consumption of wood members 14 in a CSST fire?</p> <p>15 A. Testing as in their laboratory?</p> <p>16 Q. Correct.</p> <p>17 A. I seem to recall from the Williams matter that a, 18 you know, test bed with insulation and wood frames was 19 created, but I'd have to review that laboratory demonstration 20 in detail.</p> <p>21 Q. In that video, I think they let it burn for about an 22 hour and a half; is that right?</p> <p>23 A. That sounds right.</p> <p>24 Q. I'm going to go back to your report. You write that 25 "In addition to the single, round hole in the subject CSST and</p>	<p style="text-align: right;">63</p> <p>1 Exponent's area of origin. Now looking at this photo, do you 2 see where my cursor is?</p> <p>3 A. No. I'm not sure where you went. I'm looking at 4 like -- okay. Now I know where you are.</p> <p>5 Q. Okay. And do you see any fully burned wood members 6 in Exponent's area of origin?</p> <p>7 A. I can't tell from that photograph, but I see a lot 8 of intact aluminum foil, and I also see very little damage to 9 the wood framing that is running towards me in that 10 photograph.</p> <p>11 Q. Right. And there would be insulation that was 12 packed in under or in this area; is that right?</p> <p>13 A. Yeah. And if you actually scroll that photo up, you 14 can kind of see two layers of noncombustible -- other way. 15 There's the two layers of noncombustible insulation in that 16 same space.</p> <p>17 Q. Right. And this wood member that is fully consumed, 18 it runs above the support frame; is that right?</p> <p>19 A. Sure.</p> <p>20 Q. Okay. And until now, you were unaware of this fully 21 consumed wood joist; is that right?</p> <p>22 A. If that's the case, fine, but it doesn't change my 23 opinions.</p> <p>24 Q. So even though there is evidence of arcing in this 25 area, and even though there's a fully consumed wood joist in</p>
<p style="text-align: right;">62</p> <p>1 multiple arc sites to conductors in and near the area of 2 origin." Do you see that?</p> <p>3 A. Yes.</p> <p>4 Q. And where is your area of origin?</p> <p>5 A. It's the area of most burning and observations from 6 witness statements in that attic space.</p> <p>7</p> <p>8 (Exhibit 7, Photograph, marked for identification)</p> <p>9</p> <p>10 Q. (By Mr. Guilmartin) And so I pulled up a photo that 11 I marked as Exhibit 7. And your area of origin would be at 12 the top where my cursor is and where the CSST runs; is that 13 right?</p> <p>14 A. That's probably not the best photograph, but I 15 understand where you're at.</p> <p>16 Q. Got it. And then there's a can light that is down 17 below, and then the arc site, per your notes, is about the top 18 of where this ladder is; is that right?</p> <p>19 A. That seems fair, yes.</p> <p>20 Q. Okay. And then you put in your notations that 21 there's unburned wood members; is that right?</p> <p>22 A. Yes.</p> <p>23 Q. Okay. And I want to point your attention -- and I 24 can maybe try to zoom in a little bit here. Now earlier you 25 testified that you were unaware of fully consumed wood in</p>	<p style="text-align: right;">64</p> <p>1 this area, that doesn't change your opinion?</p> <p>2 A. That's correct.</p> <p>3 Q. And in the prior matter involving the appliance, you 4 testified that a sole arc can cause a fire; is that right?</p> <p>5 A. Again, as I described, my role in that case was to 6 characterize the localized damage to that electrical artifact, 7 and then the electrical engineer used that data in his data 8 analysis.</p> <p>9 Q. Right. But here you have localized arcing in this 10 area; is that correct?</p> <p>11 A. From flame spread, contacting, and energized 12 conductor.</p> <p>13 Q. But you have -- yes or no, there is localized arcing 14 in the area where Exponent places the area of origin?</p> <p>15 A. Sure. I wouldn't disagree with the characterization 16 of damage to that conductor as an arc site.</p> <p>17 Q. Okay. So if the fire department reported in 20 18 minutes, and we don't have a gas-fed fire down in this area, 19 if this isn't the area of origin, how do we get a fully 20 consumed joist down below where Ozment places the area of 21 origin?</p> <p>22 A. So we likely have a flame spread from the 23 involvement of the plastic-backed aluminum radiant barrier 24 material that continued to drop down and continued to burn.</p> <p>25 Q. And so it's your opinion that that's a greater fuel</p>

<p>65</p> <p>1 source than a propane fire that begins at the inception of 2 this fire?</p> <p>3 A. I didn't characterize it as greater, but it's 4 definitely a fuel load that can continue to burn once ignited 5 and spread fire.</p> <p>6 Q. Can you explain to me and explain to the jury how, 7 if you have a propane fire that's burning from the inception 8 of this fire, how do you have greater damage, significantly 9 greater damage, done where Exponent has the area of origin?</p> <p>10 A. It may be the duration at which that was allowed to 11 burn, but if you have any --</p> <p>12 Q. Do you have any information -- do you have any 13 information that the fire department allowed that area to 14 burn?</p> <p>15 A. Well --</p> <p>16 MR. CATHCART: Object to form.</p> <p>17 THE WITNESS: -- again, if their focus is on 18 extinguishing the attic fire, they're probably going to 19 put water where they see smoke. But you have evidence of 20 combustible materials that continue to burn at that 21 location during the course of the fire.</p> <p>22 Q. (By Mr. Guilmartin) So it's your opinion that this 23 fully consumed joist was caused by dropdown of, I guess, the 24 radiant barrier?</p> <p>25 A. Of just flame spread from the area of origin that</p>	<p>67</p> <p>1 A. I mean, not -- I mean, it's information in and of 2 itself, but I look at the totality of the data.</p> <p>3 Q. But --</p> <p>4 A. And in this case --</p> <p>5 Q. -- the totality of the data would include that fully 6 consumed joist; is that right?</p> <p>7 A. Sure, but that's not -- I mean, it was exposed to 8 fire, so that's not unexpected.</p> <p>9 Q. But that data point, you were unaware of that until 10 today's deposition; is that right?</p> <p>11 A. I reviewed all the photographs from the area of 12 origin, and I don't know that I noted that location, but it is 13 not consistent with the short timeline of this fire.</p> <p>14 Q. But it's consistent with the dropdown from a fire 15 above?</p> <p>16 A. Yes. Fire does spread and continues to burn.</p> <p>17 Q. I may have asked you this at a prior deposition, but 18 you have three patents. What are those for?</p> <p>19 A. So one of them is related to a magnetic refrigerant. 20 Another one is related to -- they're on my wall. I'd have to 21 read them.</p> <p>22 Q. It's all right if you don't specifically recall, but 23 anything fire or fire prevention related?</p> <p>24 A. Well, I did design a passive barrier to prevent burn 25 injuries to children for shallow glass front fireplaces, but I</p>
<p>66</p> <p>1 then also caused the insulation on the conductor to be 2 compromised and an arc to occur.</p> <p>3 Q. Okay. So in this 20 minutes or 30 minutes, we have 4 fire starting at the CSST, some dropdown onto the conductor, 5 arcing at that conductor, and enough time to fully consume 6 this joist?</p> <p>7 A. Yes.</p> <p>8 Q. Do you have any information as to how long it would 9 take if we placed a radiant barrier, or some radiant barrier 10 on this joist and we ignite it, how long would it take to 11 fully consume that joist?</p> <p>12 A. I don't have that information in front of me.</p> <p>13 Q. You write in the first paragraph that you relied on 14 data gathered during the fire investigation. Do you see that?</p> <p>15 A. Yes.</p> <p>16 Q. What data are you referring to?</p> <p>17 A. That's going to be essentially the inventory of the 18 appliances, the routing of the CSST, the propane tank that was 19 on the property, the STRIKE net report, which is there listed, 20 the photographs and the measurements that occurred, you know, 21 where the CSST was found to have a perforation from leak 22 testing.</p> <p>23 Q. Don't you think it would be relevant to your 24 analysis to have been told that there was a fully consumed 25 joist where there was an arc site?</p>	<p>68</p> <p>1 released my rights in order for the manufacturer to implement 2 that safety device.</p> <p>3 Q. I understand.</p> <p>4 A. I believe there was also a potential patent 5 application for, I would say, a noncombustible fire barrier 6 for ammonium absorption refrigerators that I may have been 7 identified as a co-assignee, but I don't know if that ever 8 came to fruition in terms of a patent.</p> <p>9 Q. Methodology, you write that you performed your 10 methodology consistent with NFPA 921; is that right?</p> <p>11 A. Correct.</p> <p>12 Q. Okay. But would you agree with me again that you 13 didn't perform a complete NFPA 921 analysis?</p> <p>14 A. Again, I would defer you to my opinions, which 15 essentially identify an origin and cause, which is based on my 16 review of the data collected, the laboratory examination data, 17 and my analysis of that to arrive at those opinions, which 18 are, part in parcel, origin and cause in nature.</p> <p>19 Q. But per NFPA 921, you would agree with me that you 20 have to rule out all potential causes of a fire before making 21 a determination as to what caused a fire?</p> <p>22 A. Sure. And I do avoid that kind of confirmation bias 23 before the work is even started.</p> <p>24 Q. But here nowhere in your report did you rule out the 25 radiant barrier as the cause of this fire; is that correct?</p>

<p>69</p> <p>1 A. I did note it in the area of origin, but the</p> <p>2 description of it being the first material ignited is likely</p> <p>3 not written there.</p> <p>4 Q. On page 4 of your report, there is a discussion</p> <p>5 concerning some of the work that had been performed after this</p> <p>6 home -- after the CSST had been installed; is that right?</p> <p>7 A. The second paragraph, yes, yes.</p> <p>8 Q. And I'll do my best to kind of highlight where I'm</p> <p>9 going for you. And a water heater was replaced, and also a</p> <p>10 generator was added; is that right?</p> <p>11 A. That's my understanding, yes.</p> <p>12 Q. And do you know when the water heater was replaced?</p> <p>13 A. I don't see that in my notes of the deposition</p> <p>14 transcripts of either Mr. or Mrs. Diel, so I would look at</p> <p>15 Integrity's photographs of the name plate on the water heaters</p> <p>16 to make that determination.</p> <p>17 Q. And with respect to installing or replacing the</p> <p>18 water heater, in order to replace a gas-fired water heater,</p> <p>19 you would have to connect the -- disconnect the existing gas</p> <p>20 line and then reconnect it to the new water heater; is that</p> <p>21 right?</p> <p>22 A. Sure.</p> <p>23 Q. And would you agree with me that the CSST fed this</p> <p>24 water heater?</p> <p>25 A. One length of CSST did, yes.</p>	<p>71</p> <p>1 with respect to the bonding and grounding and the applicable</p> <p>2 codes at the time it was installed and any repairs were made.</p> <p>3 Q. The last paragraph of page 4, you write, "In other</p> <p>4 locations a radiant barrier system was affixed to the attic</p> <p>5 walls." Do you see that?</p> <p>6 A. Yes.</p> <p>7 Q. And when you say "other locations," would you agree</p> <p>8 with me that there was radiant barrier within the area of</p> <p>9 origin?</p> <p>10 A. It was generally below the location where the CSST</p> <p>11 and conductors were running, yes.</p> <p>12 Q. I'm going to go to page 5. And on page 5, earlier</p> <p>13 we had talked about Mr. Diel trying to fight the fire with</p> <p>14 his -- with the hose; is that right?</p> <p>15 A. From his deposition testimony, yes.</p> <p>16 Q. Okay. And at the top of page 5, there's two photos.</p> <p>17 The photo on the left, would you agree with me that the CSST</p> <p>18 in this photo -- you can't see where it is because it's behind</p> <p>19 the wall where my cursor is?</p> <p>20 A. Correct.</p> <p>21 Q. And so if Mr. Diel is trying to put the fire out</p> <p>22 from above this area, he's putting the fire -- or the water on</p> <p>23 the area where my cursor is; correct?</p> <p>24 A. I honestly can't tell you where the water is</p> <p>25 flowing, but it would be flowing down.</p>
<p>70</p> <p>1 Q. And do you have any opinion as to when the installer</p> <p>2 did that, if they had an obligation to install the water</p> <p>3 heater consistent with NFPA 54?</p> <p>4 A. I don't know when, and that goes beyond the scope of</p> <p>5 my retainer.</p> <p>6 Q. Do you have any knowledge that the -- when this</p> <p>7 individual replaced the water heater if they complied with the</p> <p>8 National Fuel Gas Code?</p> <p>9 A. I didn't perform that research in this case.</p> <p>10 Q. And here the CSST -- well, starting in 2009, the</p> <p>11 National Fuel Gas Code required that CSST have an independent</p> <p>12 bond; is that correct?</p> <p>13 A. I'm sorry, what was the date?</p> <p>14 Q. 2009.</p> <p>15 A. Okay. I don't have reason to disagree with that.</p> <p>16 Q. And to your knowledge, the CSST at the Diel home did</p> <p>17 not have an indirect bond; is that -- or did not have a direct</p> <p>18 bond --</p> <p>19 A. Direct bond.</p> <p>20 Q. -- is that right?</p> <p>21 A. Sure, that was my observation, yes. But I would</p> <p>22 defer to Kelly on the changes that occur over time.</p> <p>23 Q. Would you agree with me that the Diel home was not</p> <p>24 compliant with the National Fuel Gas Code as of 2009?</p> <p>25 A. Again, I would defer to Kelly for his observations</p>	<p>72</p> <p>1 Q. Okay. The photo on the right, the circle, that's</p> <p>2 where you're placing the area of origin; is that right?</p> <p>3 A. The figure note says, "The general location of the</p> <p>4 perforation in the CSST is circled within the area of origin,"</p> <p>5 yes.</p> <p>6 Q. And then -- but down below where my cursor is, and</p> <p>7 we can kind of see where the ladder is, again, that's where</p> <p>8 Exponent places the area of origin; is that right?</p> <p>9 A. According to them, yes.</p> <p>10 Q. And then between where they have the area of origin</p> <p>11 and where you have the area of origin, there would have been</p> <p>12 radiant barrier that is stapled along this wall; is that</p> <p>13 correct?</p> <p>14 A. Correct, and you can see the remains of aluminum at</p> <p>15 the bottom, yes.</p> <p>16 Q. And would you agree that that radiant barrier</p> <p>17 between where Exponent has the area of origin and where you</p> <p>18 have the area of origin that it's consumed?</p> <p>19 A. Sure.</p> <p>20 Q. Paragraph 2, you note the size of the hole. Do you</p> <p>21 have any information as to the coulombs of charge necessary to</p> <p>22 cause this size of a hole?</p> <p>23 A. On the order of 0.12 coulomb or higher.</p> <p>24 Q. Okay. When you say "or higher," what do you mean by</p> <p>25 that?</p>

<p style="text-align: right;">73</p> <p>1 A. My understanding is the minimum charge required to 2 create an opening in TracPipe CSST with the jacket is on the 3 order of 0.12 coulomb. And a higher charge will, obviously, 4 create an opening as well. 5 Q. Have you seen Johnie Spruiell's analysis with 6 respect to the coulombs of charge necessary to cause this 7 hole? 8 A. I'm aware of those calculations being done. I don't 9 know what his results were. 10 Q. Okay. And would you agree with me that in order to 11 support your opinion and all of the plaintiffs' opinions that 12 fire -- that the first fuel ignited is the gas escaping the 13 CSST, that the arcing event would need to simultaneously 14 ignite escaping gas? 15 A. And/or the combustible yellow jacket in the same 16 location, yes. 17 Q. What testing are you aware of that ignition can 18 result at an arcing event that results in a hole that is 19 .35 millimeters? 20 A. So based upon my experience with other CSST cases, 21 it is the confirmed presence of the melt and the melting 22 temperature of stainless steel which is sufficient to ignite 23 the escaping gas, whether it's propane or natural gas. 24 Q. Right, and that's a general principle that the 25 arcing event, that that temperature exceeds the ignition</p>	<p style="text-align: right;">75</p> <p>1 performed, but I do recall that there was a small opening, and 2 it was under insulation, which facilitated the fusion of gas 3 and sustained burning. 4 Q. Are you aware of any -- you listed this testing, the 5 Warren, the Dr. Eagar, the Integrity, are you aware of any of 6 them performing arc ignition testing with CSST using less than 7 one coulomb of charge? 8 A. I would have to review that world of data, and I 9 have not to date. 10 Q. And so as you sit here today, you're not aware of 11 any testing that establishes that an arc caused by less than 12 one coulomb of charge can result in ignition; is that right? 13 A. Again, there's a lot of data. I haven't reduced it 14 to answer that question at this time. It's possible. 15 Q. So, as of right now, you're aware of none; is that 16 correct? 17 A. I would have -- 18 MR. CATHCART: Object to form. 19 THE WITNESS: -- to do the additional research. 20 Q. (By Mr. Guilmartin) Do you know that Exponent used 21 1,000 percent of the charge necessary to cause the hole in the 22 Diel home in their ignition test? 23 A. I'm kind of confused as to what Exponent testing 24 you're referring to. 25 Q. The Integrity test. Are you aware that Integrity,</p>
<p style="text-align: right;">74</p> <p>1 temperature necessary for propane; is that right? 2 A. It's not a general principle. It's the properties 3 of the material involved and the temperature required to melt 4 it, yes. So it's more of a scientific as opposed to a general 5 principle. 6 Q. And Exponent has done some testing to show that this 7 arc -- that you don't get ignition when this arc event occurs 8 because there's too much velocity and you have to have mixture 9 of oxygen and propane in order to get ignition; is that right? 10 A. So, apparently, Exponent cannot achieve ignition 11 with escaping gas from CSST, but others clearly have. 12 Q. And the others that have, that would include 13 Integrity; is that right? 14 A. I believe Integrity, UL, The Warren Group, as well 15 as the late Tom Eagar's laboratory, have all achieved ignition 16 of escaping gas from perforations in CSST. 17 Q. And would you agree with me that even in those tests 18 that they don't always get ignition? 19 A. So the conditions of ignition, you know, can vary, 20 but any obstruction in the gas stream as it escapes can 21 facilitate the mixing and ignition. 22 Q. And, for example, the Integrity testing in the 23 Williams matter, more often than that, they couldn't get 24 ignition; is that right? 25 A. I don't recall the specifics of the testing</p>	<p style="text-align: right;">76</p> <p>1 in their ignition test, used 1,000 percent the coulombs of 2 charge that was necessary to cause the hole in the Diel home? 3 A. Again, I don't know that we were looking for the 4 minimum charge required to create the opening, but to 5 essentially establish an opening and what follows. So I don't 6 know if the purpose of the test was to do that specifically, 7 so they did what was necessary to create an opening. 8 Q. So you're aware of no tests that show that the 9 charge that caused this hole specifically can result in 10 ignition? 11 A. Again, I'm looking -- 12 MR. CATHCART: Object to the form. 13 THE WITNESS: Again, I'm looking at the positive 14 evidence of definite melting which, given the melting 15 temperature of stainless steel fire, exceeds ignition 16 temperature of propane gas. So it doesn't matter to me 17 the number of coulombs, but it's the coulombs, whatever 18 they were, were sufficient to melt stainless steel, which 19 has high enough temperatures to ignite the escaping gas. 20 Q. (By Mr. Guilmartin) Name one test performed by 21 anybody in the world that an arc caused by a charge of less 22 than half a coulomb can result in ignition? 23 A. I'd have to do that additional research to answer 24 that question. It doesn't mean it can't happen, as it did in 25 this case.</p>

<p style="text-align: right;">77</p> <p>1 Q. But here it's the plaintiff's burden to establish</p> <p>2 that this specific arc resulted in ignition. Can you tell me</p> <p>3 one test that you're aware of that confirms that this is</p> <p>4 possible?</p> <p>5 A. Again, I'm looking at the presence of molten</p> <p>6 stainless steel, which has significantly higher melting</p> <p>7 temperatures than the ignition temperature of propane. That's</p> <p>8 all I need.</p> <p>9 Q. Can you tell me if there's one test that establishes</p> <p>10 that this is possible?</p> <p>11 A. We have the physical data from this case, but I'd</p> <p>12 have to do additional research in order to answer that</p> <p>13 question.</p> <p>14 Q. Why didn't Integrity just do the test in this case</p> <p>15 if they were going to offer this opinion?</p> <p>16 MR. CATHCART: Object to the form.</p> <p>17 THE WITNESS: Ask Integrity.</p> <p>18 Q. (By Mr. Guilmartin) Did you ask Integrity to</p> <p>19 perform the test to confirm that this arc can result in</p> <p>20 ignition?</p> <p>21 A. No.</p> <p>22 Q. Paragraph 3 at the bottom of page 5, this is where</p> <p>23 you discuss the EDS work that was performed at the lab; is</p> <p>24 that right?</p> <p>25 A. Correct.</p>	<p style="text-align: right;">79</p> <p>1 there wasn't a transfer of material?</p> <p>2 A. So we didn't have an ensuing fire, so we kind of</p> <p>3 looked at what was present around the melt opening and what</p> <p>4 was present on the jacket, but we were specifically looking</p> <p>5 for zinc.</p> <p>6 Q. Bottom of page 6, this is where you're noting the</p> <p>7 arc sites, the copper conductors near the CSST and where --</p> <p>8 Exponent's area of origin; is that correct?</p> <p>9 A. Yes.</p> <p>10 Q. And I know that you don't believe that those arcs</p> <p>11 caused this fire, but these arc sites are potential ignition</p> <p>12 sources; is that correct?</p> <p>13 A. Under some conditions, yes.</p> <p>14 Q. And then so per NFPA 921, you would have to</p> <p>15 establish that each of these arc sites was not the cause of</p> <p>16 the fire in order to rule them out as a cause; is that right?</p> <p>17 A. Correct.</p> <p>18 MR. CATHCART: Object to the form.</p> <p>19 THE WITNESS: And that was done.</p> <p>20 Q. (By Mr. Guilmartin) Page 7, you discuss the</p> <p>21 temperature of the arc and the ignition temperature for</p> <p>22 propane; is that right?</p> <p>23 A. Yes.</p> <p>24 Q. And this analysis, though, does not consider the</p> <p>25 velocity to have the gas, nor does it consider the necessary</p>
<p style="text-align: right;">78</p> <p>1 Q. The footnote --</p> <p>2 A. Can you -- I'm sorry. I have to indicate that my</p> <p>3 battery is low. I just want to confirm I am plugged in. Give</p> <p>4 me one second.</p> <p>5 Q. Sure.</p> <p>6 A. I apologize. Please proceed.</p> <p>7 Q. Yeah, no problem at all. The footnote, "Previous</p> <p>8 laboratory studies have shown that the metals from the arc</p> <p>9 event with corresponding electrodes can deposit on the jacket,</p> <p>10 which is then consumed." What you're saying here is that</p> <p>11 sometimes when there's an arc event, that the presence of the</p> <p>12 jacket may result in, I guess, a lack of material transfer.</p> <p>13 Is that the point you're making here?</p> <p>14 A. In some cases, yes. But what I'm referring to</p> <p>15 specifically with that footnote is when we forced an arc to</p> <p>16 occur in the laboratory between CSST and galvanized steel</p> <p>17 ductwork, and then we looked at the chemistry and the size of</p> <p>18 the opening from those various tests.</p> <p>19 Q. And in those tests, you actually -- there was a</p> <p>20 jacket, but you put a hole in the jacket where the arcing</p> <p>21 event occurred; is that correct?</p> <p>22 A. Most likely, but I don't recall the specifics of the</p> <p>23 case other than it was a galvanized sheet steel ductwork that</p> <p>24 we were arcing against, or with.</p> <p>25 Q. And in those instances, there was an arc event, but</p>	<p style="text-align: right;">80</p> <p>1 mixing of oxygen and propane, in order to have ignition; is</p> <p>2 that right?</p> <p>3 A. Well, it goes without saying we didn't have an</p> <p>4 explosion, so we know we didn't have the release of gas that</p> <p>5 was not ignited and accumulated resulting in an explosion. We</p> <p>6 had the occurrence of fire very quickly, which is all very</p> <p>7 consistent with the release of propane into space that</p> <p>8 contains oxygen and a competent ignition source.</p> <p>9 Q. The sentence that I have highlighted in the second</p> <p>10 paragraph of your engineering analysis, "In this case the</p> <p>11 short timeline between the lightning strike, the size and</p> <p>12 shape of the hole, and the absence of copper in the melt</p> <p>13 confirms the arc event that caused the hole in the CSST was</p> <p>14 lightning induced."</p> <p>15 A. Yes.</p> <p>16 Q. The absence of copper, will you agree with me that</p> <p>17 you don't always get transfer of copper when there's arcing</p> <p>18 between CSST and a Romex copper electrode?</p> <p>19 A. I don't know that I agree with that statement</p> <p>20 100 percent. It depends.</p> <p>21 Q. And what does it depend on?</p> <p>22 A. The person doing the analyses, where the analyses</p> <p>23 are occurring, if they're taking into consideration the base</p> <p>24 metal chemistry of CSST contains copper. So you have to look</p> <p>25 at concentration. And then there are definitely other</p>


<p style="text-align: right;">81</p> <p>1 published studies which show the presence of significant 2 amounts of copper present in the melt when it's the result of 3 intimate contact between an energized conductor and CSST 4 during an ensuing fire. So there's a lot of evidence that 5 supports that. 6 If this were the result of contact between an 7 intimate energized conductor and CSST during an existing fire, 8 which is not supported by the timeline, then we would 9 definitely expect to see some copper in excess of the base 10 metal chemistry in the area of the melt. 11 Q. Okay. But in those -- well, so you would agree with 12 me that there are some analyses that show that there is 13 transfer of the copper, and others show that sometimes there 14 isn't; is that right? 15 A. Well, I would -- for example, in the report by 16 Morris, he says no copper was found. I don't see the 17 corresponding analyses. He just points to an appendix that 18 doesn't contain any chemistry data, so I can't take his word 19 for it. But then if you go to any previous instance where 20 Exponent actually did any EDS analysis, they're not looking at 21 the entire melt opening. They're choosing spots and assuming 22 they're going to capture that location of copper, and they're 23 completely disregarding that there's small amounts of copper 24 in the base metal chemistry of CSST to begin with. So, in the 25 case of Morris' statement and his reference to his appendix,</p>	<p style="text-align: right;">83</p> <p>1 to the size. So did a hole occur, yes or no. And then if it 2 did, how many. And then I don't recall if they described the 3 size of the openings, but I know they selected a handful of 4 them and said that the transfer of copper from the conductor 5 was either visible -- but they did do that analysis. I just 6 don't recall specifically if they discussed the size. 7 Q. So if we take Exponent's theory that this hole was 8 caused by a fire burning and then the Romex coming into 9 contact with the CSST, it would have to be very low on the 10 waveform of -- it would have to be very low on the waveform; 11 is that right -- 12 A. Sure. 13 Q. -- according to coulombs of charge? 14 A. I haven't done that analysis, but you have to have 15 intimate contact between the CSST and the Romex for that to 16 occur, and an existing fire. 17 Q. Right. 18 A. And I don't see that occurring in this short 19 timeline of this particular fire. 20 Q. But if we take that as true, the hole, the size 21 would be dependent on where on the waveform -- 22 A. The event occurred. 23 Q. -- the arc occurs? 24 A. Sure. 25 Q. Right. So if this is on the lower end of the</p>
<p style="text-align: right;">82</p> <p>1 there is no data there to support his statement whatsoever, so 2 I'm not going to agree with it based on any work that Exponent 3 has done. 4 Q. You just criticized their use of EDS in the picking 5 of points. Isn't that what you did in this case? 6 A. No. In fact, we did dot mapping. And dot mapping 7 essentially looks at the chemistry around the entire opening. 8 And the two dot maps that were collected, none of it shows the 9 presence of copper. 10 Q. Are you aware of any EDS analysis of holes caused by 11 contact between a Romex wire and CSST that are less than one 12 coulomb of charge where you have transfer of copper? 13 A. I would have to do that additional research. I 14 don't know, but definitely The Warren Group performed some 15 testing where conductors were in intimate contact with CSST 16 during an existing fire, and they noted the -- I believe it 17 was the visible observation of copper after those tests. But 18 again, in reviewing Exponent's report and their reference to 19 Appendix C, there was no data to analyze to support that 20 statement. 21 Q. And The Warren Group testing, when they were doing 22 the testing, do you know if they were getting bigger or 23 smaller holes than the hole observed here? 24 A. I'd have to review that paper in detail, but I 25 believe they were quantifying the number of holes as opposed</p>	<p style="text-align: right;">84</p> <p>1 waveform, are you aware of any studies that show that when you 2 have a lower waveform arc that you see this material transfer? 3 A. I have only seen from my recollection is that kind 4 of analysis performed with the size of an arc site on 5 conductors only, meaning -- like so do you get a notch? Do 6 you get a severed? Do you get, like, a decent notch based in 7 where on the waveform that arc event occurs? I can't say 8 sitting here that I have seen that research done with CSST. 9 Q. Yeah, and this may be something I should discuss 10 further, but just in my mind, you know, I think, well, if 11 there is a lower charge transfer for the arc, there would be 12 less likelihood of material transfer. Does that not make 13 sense? 14 A. Well, the melting temperature of copper is even 15 lower than the melting temperature of stainless steel. So I 16 would think if you have temperature charge sufficient to melt 17 stainless steel, you're definitely going to have sufficient 18 energy to melt and transfer some copper. But, again, I don't 19 think I have seen that particular study, or I have to do that 20 research. 21 Q. So the paragraph on page 8 that I'm highlighting, 22 this is your arc mapping analysis; is that right? 23 A. That is my analysis of all the data gathered from 24 this particular fire scene according to the scientific method 25 to arrive at the conclusion.</p>

<p style="text-align: right;">85</p> <p>1 Q. But there is no discussion of the radiant barrier; 2 is that correct? 3 A. In that paragraph, no. 4 Q. And there is no discussion of the fully consumed 5 joist in this analysis. Why is there no discussion of that? 6 A. Because wood burns during fires. And in that area 7 we can have fire spread, which it did from the area of the 8 opening in the CSST. 9 Q. But isn't it relevant to consider the area where you 10 have the most damage to wood members when you're doing a 11 causation analysis? 12 A. I think you have to look at all of the data. So 13 it's the totality of the evidence, not only the fuel load, but 14 the effects of ventilation and orientation and thermal inertia 15 and time. 16 MR. GUILMARTIN: Why don't we take 10 minutes, 17 and -- I mean, I'll leave it up to everybody. I don't 18 think that I have more than a half hour left. So if we 19 take 10, we can finish up around, you know, 1:10 my time. 20 But if folks are, like, itching to get lunch, I'm happy 21 to take a break, too. 22 MR. CATHCART: Let's take 10, but then finish up. 23 MR. GUILMARTIN: All right. 24 THE WITNESS: Okay. See you in 10 minutes. 25 VIDEOGRAPHER: The time is 11:32 a.m. Going off the</p>	<p style="text-align: right;">87</p> <p>1 A. It appears to me that you're -- let's just look 2 at -- copper is 0.241 if you scroll up. 3 Q. Yep. 4 A. All of the way. 0. -- it's the same report. It's 5 produced twice. 6 Q. Okay. Is there another report that's out there? 7 A. What do you mean? 8 Q. Like, was there just one test, one ICP analysis run, 9 or were there two in this case? 10 A. My recollection is there was only one, but I have 11 been maintaining a database for -- 12 Q. Got it. 13 A. -- many years, but I believe there was only one 14 sample in this case that was collected and analyzed. 15 Q. Got it. All right. So this is just on the CSST 16 that was sent to RTI, and there is only one analysis 17 performed? 18 A. Correct. 19 Q. Got it. 20 21 (Exhibit 9, Williams Article, marked for 22 identification) 23 24 Q. (By Mr. Guilmartin) Exhibit 9, this is one of your 25 articles that you relied on in Williams, "Method to</p>
<p style="text-align: right;">86</p> <p>1 record. 2 3 (Off record, 11:32 a.m. to 11:44 a.m.) 4 5 VIDEOGRAPHER: The time is 11:44 a.m. Back on the 6 record. 7 Q. (By Mr. Guilmartin) Dr. Buc, I only have a little 8 more for you. I'm going to pull up what I have marked as 9 Exhibit 8. Do you see this document? 10 A. Yes. 11 12 (Exhibit 8, ICP Analysis, marked for 13 identification) 14 15 Q. (By Mr. Guilmartin) And this is just the ICP 16 analysis of the CSST that you sent out to RTI; is that right? 17 A. Yes. 18 Q. Okay. And this was done specific for this case? 19 A. Yes. I apologize, but it looks like you have two 20 identical -- if you scroll down, it looks like that's -- that 21 may be identical. 22 Q. Yeah. And so, did you run the same piece of CSST 23 twice or -- 24 A. No. 25 Q. -- are there multiple samples?</p>	<p style="text-align: right;">88</p> <p>1 Characterize Damage to Conductors From Fire Scenes." And in 2 Williams, you were kind of relying on this paper to establish 3 that what Exponent was saying was an arc isn't an arc at all. 4 But here you agree with Exponent that there is an arc. 5 A. Yes. There were multiple arc sites, yes. 6 Q. Now, what is arc through char? 7 A. Essentially the conductors, while energized, are 8 surrounded by plastic. And when that plastic is exposed to 9 heat and/or fire, it starts to decompose and that plastic 10 becomes conductive when it's a char, and then you can have 11 current pass through that, and then you're essentially 12 shorting internally. 13 Q. And are you aware of any way to distinguish arcs 14 caused by arc through char versus arcs caused as a result of a 15 fire that is developing and causing a typical arc? 16 A. So you have to start at where the arc is occurring 17 because if it's midstream, there is no reason for an arc to 18 occur midstream pre-fire. If you're going to have an arc 19 location in any electrical circuit, it's more likely to occur 20 either if a nail impacted it or a staple or it's at a 21 connection. But usually when you have an arc site midstream, 22 that's from attack by fire because there is no reason for an 23 arc to occur midstream otherwise, but for attack from heat 24 and/or fire or if it's pinched under a staple or a nail or 25 anything like that. But, historically, you can't look at an</p>

<p style="text-align: right;">89</p> <p>1 arc site whether it's cause versus victim. You have to look 2 at the totality of the data. 3 Q. Okay. So it's your opinion that we can't look at 4 these arcs and tell whether or not it was arc through char or 5 what Exponent is saying that was consumed in the fire, then we 6 have arcing occur? 7 A. Again, they are all midstream -- 8 Q. But there is -- 9 A. -- so we don't have -- I know, but you have to look 10 at there's -- you know, unless we had a nail at one location 11 or a staple, you know, at one location. But when you look at 12 the totality of the conductors and their arc sites, they are 13 all midstream, and that's all consistent with it occurring, 14 you know, from the application of heat and/or fire causing the 15 plastic to degrade, and then you have arcing through char. 16 Q. But the arc, the kind of lone arc, the lonely arc 17 down at the bottom, that was where this wood joist was, but 18 the wood joist is gone; is that right? 19 A. And that same arc can occur from the spread of fire, 20 so it supports the spread of fire. 21 Q. Right, but we don't know if there was -- if it was 22 stapled on or -- we don't know how it was affixed to that, if 23 at all, affixed to that wood joist; is that right? 24 A. I haven't done that research, but usually staples 25 survive, or you can look at the frequency of stapling to the</p>	<p style="text-align: right;">91</p> <p>1 Usually it blows the fuse, so, you know, it travels along the 2 conductor, gets into the equipment, and then it blows the 3 fuse, or it causes other damage, like, to printed circuit 4 boards. It doesn't necessarily start a fire, but my 5 experience with lightning-induced damage to electronic 6 devices and appliances is usually in the appliance or, you 7 know, in this case at the receptacle, but I'm not so sure 8 about midstream. 9 Q. Would you agree with the following statement, 10 "Lightning in and of itself has long been recognized as a 11 potential natural and sufficient cause of a fire"? 12 A. In some cases. 13 Q. Okay. What would you agree with in that statement? 14 A. I mean, we have -- you know, lightning has been 15 around for a long time, and the lightning phenomenon has been 16 around a long time, and there have been studies how it impacts 17 electronic devices and appliances. But it has a different 18 effect on black iron pipe than it does CSST and some forms of 19 radiant barrier and, you know, localized damage to just roofs. 20 But, again, I don't know what data is being kept by the 21 National Fire Protection Association about lightning strike 22 data that is not reported. 23 Q. So the sentence that I read you, that's from -- it's 24 the opening line -- 25 A. Sure.</p>
<p style="text-align: right;">90</p> <p>1 left or to the right to determine, you know, whether a staple 2 could have been there. But if we were to -- if we had a 3 hypothesis about a staple, then you would look for the 4 transfer of either iron to the conductor or copper to the 5 staple, if you find it, to support a staple was the cause of 6 that arc site. 7 Q. And this concept regarding the mid-run arc, would 8 you agree with me that that doesn't apply when we're dealing 9 with an extremely high-voltage lightning strike? 10 A. Again, I would defer to Kelly where that's most 11 likely to manifest itself, either at a connection or plug 12 blade or a ground pin. But my experience with arc sites 13 midstream are typically from attack by heat and/or fire, 14 unless you have chafing. But chafing is usually associated 15 with, like, vehicles, and that's not this. 16 Q. Right. But, you know, earlier you talked about the 17 location of the arc, and how that is relevant. 18 A. Yeah. 19 Q. When we have a high-voltage lightning strike, 20 that's -- that concept doesn't apply to a high-voltage 21 lightning strike; is that right? 22 A. I would defer to Kelly in answering where a 23 high-voltage lightning strike would have the most impact on a 24 conductor running through a home. I mean, I have seen 25 lightning strike damage to electronic devices and appliances.</p>	<p style="text-align: right;">92</p> <p>1 Q. -- of what I have marked as Exhibit 10, a case study 2 of a radiant barrier system. 3 4 (Exhibit 10, Case Study, marked for identification) 5 6 Q. (By Mr. Guilmartin) I only have a couple of 7 questions on this because we talked about it a little bit. I 8 am going to go down before your conclusion. Earlier we talked 9 about the testing that Exponent -- I'm going to mix them up 10 the entire time, and I know they probably will both hate me 11 for it, but I'm highlighting a paragraph regarding Integrity's 12 testing, and it says, "In our testing of radiant barrier 13 system products, video recordings showed fires occurred at the 14 vent channel after the electrical arc." Do you see that? 15 A. Yes. 16 Q. And so earlier there was kind of a confusion as to 17 whether or not the fires that were being generated in the lab 18 were caused by, you know, like a butane lighter or an 19 electrical arc. But at least this sentence suggests that 20 they're creating an electrical arc to start a fire at the 21 radiant barrier? 22 A. So for specific types of radiant barrier that were 23 not present in the Diel home. So I was referencing in the 24 laboratory examination of evidence from the Diel home that 25 included the radiant barrier. I thought we had done an</p>

<p style="text-align: right;">93</p> <p>1 ignition test with an open flame, a non-arc site. But this 2 paper describes other radiant barrier material unlike the Diel 3 radiant barrier that was tested in the laboratory using a 4 high-voltage event. And I think we may not have disclosed the 5 manufacturers in this particular paper for obvious reasons, 6 but my recollection and my observations of the radiant barrier 7 from the Diel home was not part of this study in this 8 publication.</p> <p>9 Q. Yeah. I'm just -- but the mechanism to ignite the 10 radiant barrier was an arc at the vent channel where this clip 11 is; right?</p> <p>12 A. It's not at the vent channel. It's between panels 13 of radiant barrier, which is like a thin layer of foil on a 14 board backing, and then you use these, like, steel H clips to 15 kind of, you know, piece those all together. That's not what 16 is in the Diel home.</p> <p>17 Q. Right.</p> <p>18 A. The Diel home is a different form altogether.</p> <p>19 Q. But the Diel home had staples, and arcing between 20 the radiant barrier and the staple would, essentially, be the 21 same concept as arcing to the clip. Am I missing something?</p> <p>22 A. Yeah, I don't think you can say that with certainty. 23 You would have to have the physical evidence of the staple to 24 support that. And the size of these clips in this particular 25 paragraph, I mean, they're fairly large. Maybe they are like</p>	<p style="text-align: right;">95</p> <p>1 matters; is that right?</p> <p>2 A. Yes.</p> <p>3</p> <p>4 (Exhibit 11, Paterson Decision, marked for 5 identification)</p> <p>6</p> <p>7 Q. (By Mr. Guilmartin) What I have marked as 8 Exhibit 11 is a ruling on a motion to preclude and a motion 9 for summary judgment from the District Court of Connecticut. 10 Have you seen this order before?</p> <p>11 A. No.</p> <p>12 Q. Okay. And it's relatively recent. Do you see that 13 it was issued on March 28, 2022?</p> <p>14 A. Yes.</p> <p>15 Q. And so I'm going to go down. I guess I can start --</p> <p>16 A. Yeah, I would like to read that. So is there a way 17 that I can read that? Can you share it with me?</p> <p>18 Q. Read it -- I'm sorry.</p> <p>19 A. In its entirety.</p> <p>20 Q. Like right now?</p> <p>21 A. I mean, I'd like to.</p> <p>22 Q. I mean, I can get it to you. I mean, we can send 23 you the exhibits. I'm just going ask you some questions 24 involving admissions that State Farm made in the Paterson 25 case.</p>
<p style="text-align: right;">94</p> <p>1 an inch by an inch, whereas a staple is a very small object. 2 So I can't say that I agree with that statement for the 3 radiant barrier that existed in the Diel home and the way it 4 was attached to the wood framing.</p> <p>5 Q. I'm going to read into the record the next sentence. 6 "Based on field observations, elimination of other ignition 7 sources, laboratory testing and data, engineering literature 8 and the combustion of particulate aluminum, the minimum 9 conditions for ignition of the polystyrene foam are met when 10 radiant barrier materials become involved in lightning strike 11 discharge to ground."</p> <p>12 I'm not going to ask you if I read that right 13 because I know I messed up a couple of things there. But 14 would you agree with me that one of the conclusions of this 15 paper is that arcing at radiant barriers can result in 16 ignition?</p> <p>17 A. Some forms of radiant barrier, yes. And 18 specifically the installation is a contributing factor.</p> <p>19 Q. In Williams, you were retained by an insurance 20 company, State Farm; is that right?</p> <p>21 A. I believe that to be the case, yes.</p> <p>22 Q. And you have worked or you have been retained by 23 State Farm in other matters; is that right?</p> <p>24 A. I have, both locally and in Texas, yes.</p> <p>25 Q. And you have worked with State Farm on some CSST</p>	<p style="text-align: right;">96</p> <p>1 A. I'm not familiar with the Paterson -- I know, but 2 I'm not familiar with the Paterson case. So without reading 3 the entire document, I kind of hesitate to answer a question, 4 you know, in a vacuum.</p> <p>5 Q. We can try it, and if you're -- if it's going to be, 6 you know, your position that, you know, you can't respond, 7 that's fine. But do you agree or disagree with the following 8 statement, "What is not disputed is that TracPipe can be 9 installed approximately 75 percent faster than traditional 10 black iron pipe, making it far less expensive"?</p> <p>11 A. I have never timed it.</p> <p>12 Q. Would you agree or disagree with the statement, 13 "Another benefit to TracPipe is that because it can flex and 14 bend without breaking, it is less prone to leaking during a 15 flood, earthquake, tornado, or other similar event"?</p> <p>16 A. Again, I think if an earthquake were to compromise 17 your home, you have bigger problems to worry about than a leak 18 from your TracPipe. But, I mean, I don't dispute it's 19 flexible, but we're not talking about a flood, earthquake, 20 tornado, or other similar event in the Diel matter, so it's 21 not really relevant.</p> <p>22 Q. If you can, yes or no on this one, do you agree or 23 disagree with this statement, "CSST products and TracPipe in 24 particular have been independently tested and found to be a 25 suitable distribution method of gas within a structure and are</p>

<p style="text-align: right;">97</p> <p>1 recognized by all 50 states and the National Model Fuel Gas 2 Code as an approved gas piping system"? 3 A. I can't agree with that statement without reading 4 the entire document. 5 Q. Are you aware of any state that -- well, the 6 National Model Fuel Gas Code approves CSST; is that right? 7 A. In some cases, yes. But, again, I mean, you should 8 look to the National State Fire Marshals Association for their 9 comment on whether it's suitable or not. And I would also 10 look to Lubbock, Texas, to determine whether it's suitable or 11 not. So aside from that, I'm not going to agree with that 12 statement. 13 Q. Do you agree or disagree that the design and 14 installation guide must be used in conjunction with state and 15 local building codes and that in the absence of local codes, 16 installation must be in accordance with the current edition of 17 the National Fuel Gas Code? 18 A. Only in general. 19 Q. Do you agree or disagree that TracPipe must only be 20 installed by a qualified person who has been trained or 21 otherwise qualified through the TracPipe Gas Piping 22 Installation Program? 23 A. There could be historical qualifications to that. 24 Q. And what do you mean by that? 25 A. I know that the qualified person has to be trained,</p>	<p style="text-align: right;">99</p> <p>1 Q. But here you yourself admit that there is a very 2 small hole; is that right? 3 A. It doesn't take a big one to create a fire hazard. 4 Any hole, any size, once it releases gas creates a hazardous 5 condition of fire or explosion. 6 Q. Right. But would you agree with me that you have no 7 information to support an opinion that bonding would not have 8 prevented this transfer of .13 coulombs of charge? 9 A. I would defer to Kelly on where the lightning 10 strikes and the impedance of various conductors in the area. 11 But, in my opinion, the presence of even a small hole creates 12 a hazardous condition. 13 Q. But that's not my question. My question is wouldn't 14 the bonding have prevented this small hole? 15 A. Not in all cases. 16 Q. But you have -- well, are you aware of whether or 17 not the bonding in this instance would have mitigated enough 18 to prevent this .13 coulomb-sized hole? 19 A. Again, I would defer to Kelly, but I'd just say it's 20 possible, but not the next lightning strike. 21 Q. But it's possible that it would prevent this 22 lightning strike? 23 A. So I would defer to an article published by 24 Professor Eagar on a number of simulations he performed to 25 evaluate the efficacy of direct bonding for various lightning</p>
<p style="text-align: right;">98</p> <p>1 but historically I don't know if that's always been the case, 2 which I think it has been. But, again, that's my general 3 understanding for this product. 4 Q. Do you know whether or not the installer was 5 certified or trained to install CSST? 6 A. Everywhere, or are you being specific to the Diel 7 case? 8 Q. The installer at the Diel home. 9 A. So based on my understanding, it performed reliably 10 for two decades. And so had it been installed improperly in 11 terms of the fittings and how it was routed, that's one thing. 12 But it performed reliably for two decades until the house was 13 struck by lightning and it failed. So if you look at the 14 totality of the data with respect to its age and installation, 15 it's not like we had, you know, a failure with chafing or any 16 other installation-related issue. I know that there is a 17 direct bonding question, which I'll defer to Kelly about. But 18 if you look at a product that is supposed to, you know, exist 19 for the entire duration of the home, like electrical 20 conductors, this one didn't fail until the house was struck by 21 lightning, but it was only a matter of time. 22 Q. Okay. But the CSST was not bonded, and the bonding 23 is meant to mitigate against what happened; is that right? 24 A. Only under some conditions, but that's not an 25 absolute certainty as far as I know.</p>	<p style="text-align: right;">100</p> <p>1 strikes and where they attach to the home. So I don't think 2 it's a one-answer question. I think you need to look at, you 3 know, what is available for review. 4 Q. I'm going to go back to the Paterson decision. Do 5 you agree or disagree with the statement, "Bonding is 6 effective at reducing the risk of an arcing event because it 7 reduces the voltage difference between the TracPipe and other 8 metal structures to below the difference required to initiate 9 an arc"? 10 A. In some cases, but not in all. 11 Q. Would you agree or disagree with the statement, 12 "Bonding of the type described in the guide is required to 13 significantly reduce the likelihood of arcing in the event of 14 a lightning strike"? 15 A. My understanding is it can also increase the 16 likelihood under some conditions. 17 Q. So you don't agree with that statement? 18 A. Yeah, I'd like to read the whole opinion. I don't 19 like looking at sentences, you know, just for what it's worth. 20 Q. Okay. One more question on this. Do you agree or 21 disagree with the statement, "Further, even if the bonding 22 does not reduce the voltage enough to prevent an arc entirely, 23 it reduces the risk that an arc will cause a hole in the 24 TracPipe"? 25 A. Which is not required for black iron pipe. So I</p>

<p style="text-align: right;">101</p> <p>1 don't care what bonding can or can't do when black iron pipe 2 would not behave the same way under the same conditions. 3 Q. Yeah, but black iron pipe -- I mean, it's a 4 different product. Black iron pipe requires pipe dope, and 5 it's a different product. 6 A. Yeah, but it's leak-free forever. I mean -- 7 Q. Except an explosion that kills five people in the 8 presentation that you performed? 9 A. Yeah. I don't know what you're talking about, but 10 black iron pipe would not require, you know, bonding to reduce 11 the voltage under any condition to prevent a tiny hole or 12 otherwise that would release gas into the confined space of a 13 home. 14 Q. I'm not going to have anything further. I do -- I 15 thank you for your time, as always. I'm getting quicker and 16 quicker. So that was done in about three hours. So unless 17 Bill -- do you have any questions? 18 MR. CATHCART: I just have a couple. 19 MR. GUILMARTIN: Okay. Sorry about that. Have at 20 it. 21 22 CROSS-EXAMINATION BY MR. CATHCART: 23 24 Q. Ms. Buc, in your testimony you're referring to a 25 number of cases that you had been retained by or testified on</p>	<p style="text-align: right;">103</p> <p>1 CERTIFICATE OF COURT REPORTER 2 3 I, Christine E. Borrelli, Registered Merit Reporter 4 and Certified Court Reporter, a Notary Public, do certify that 5 the deposition of ELIZABETH C. BUC, Ph.D., PE, CFI, taken on 6 Thursday, May 11, 2023, was stenographically reported by me; 7 that the witness provided satisfactory evidence of 8 identification, before being sworn by me; that the transcript 9 produced by me is a true and accurate record of the 10 proceedings; that I am neither counsel for, related to, nor 11 employed by any of the parties to the above action; and 12 further that I am not a relative or employee of any attorney 13 or counsel employed by the parties thereto, nor financially or 14 otherwise interested in the outcome of the action. 15 16  17 18 Christine E. Borrelli 19 Stenographic Reporter 20 21 22 23 24 25</p>
<p style="text-align: right;">102</p> <p>1 behalf of Farm Bureau; is that correct? 2 A. Yes. 3 Q. Was that Farm Bureau of Michigan? 4 A. Yes. 5 Q. Have you ever, in the past, done any work for 6 Oklahoma Farm Bureau Mutual Insurance Company? 7 A. Not to my knowledge beyond this case, no, sir. 8 Q. Okay. That's all I have. Thank you very much. 9 Read and sign. 10 A. Have a great day everybody. 11 VIDEOGRAPHER: It's 12:09 p.m., we're going off the 12 record. 13 14 (Deposition concluded at 12:09 p.m.) 15 16 17 18 19 20 21 22 23 24 25</p>	<p style="text-align: right;">104</p> <p>1 SIGNATURE PAGE/ERRATA SHEET 2 3 WITNESS: ELIZABETH C. BUC, Ph.D., PE, CFI 4 5 CASE: OKLAHOMA FARM BUREAU MUTUAL INSURANCE COMPANY AS 6 SUBROGEE OF MICHAEL DIEL vs. OMEGA FLEX, INC. 7 8 9 10 11 12 13 14 15 16 17 I, ELIZABETH C. BUC, Ph.D., PE, CFI, have read the 18 transcript of my deposition taken Thursday, May 11, 2023, 19 except for any corrections or changes noted above, I hereby 20 subscribe to the transcript as an accurate record of the 21 statements made by me. 22 Signed under the pains and penalties of perjury. 23 24 _____ DATE: _____ 25 Elizabeth C. Buc, Ph.D., PE, CFI</p>

Elizabeth Buc, Ph.D. - May 11, 2023

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